MONITORING OF SOCIAL FORESTRY IN NEPAL: A CASE STUDY OF THE NEPAL-AUSTRALIA FORESTRY PROJECT

By

Damodar Ghimire

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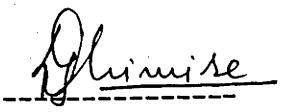
DECLARATION

Except where otherwise indicated this sub-thesis is my own work.



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ABSTRACT

Forests in the Hills of Nepal provide firewood, fodder and grazing land for livestock, and create environmental stability for food production. Due to the continuous depletion of forests and decline in soil fertility, Hill-dwellers have to spend more time collecting fuelwood and fodder and greater labour input is required to cultivate land with low yields. Forest regeneration will allow more time to be spent on other productive work.

The philosophy behind NAFP is community forestry. This concentrates on improving living conditions by the production of enough forest products for direct consumption. NAFP-3 will carry on the afforestation activities of NAFP-2 and will develop management plans for the distribution of forest products to be harvested from trees already planted. The management of forests will be based on the concept of sustained yield, stressing the greatest good for the greatest number of people over a long duration.

Due to the long gestation period of forest production, frequent monitoring and evaluation are necessary. Though monitoring and evaluation are always separated conceptually and functionally, in the case of NAFP they have been functionally integrated. Thus monitoring has been considered to be a time-bound aid to management and has been linked with on-going evaluation. This integration is done on the existing information system of NAFP in order to improve project performance during implementation.

In NAFP, monitoring and evaluation has wider purposes than the usual narrow, management-oriented systems. It is necessary also to monitor and evaluate the effects of NAFP on people's attitudes and the impact of reforestation on the rural economy. The monitoring and evaluation system of NAFP-3 is developed around the logical framework of the project.

The monitoring and evaluation indicators are grouped into inputs,

outputs and direct effects, indirect effects, and long-term impacts. These indicators can be summarised under the following broad headings:

- total number of trees planted in HMG, PF, PPF, and private land
- survival rates of trees planted
- forest area brought under the management of PF and PPF
- increases in knowledge, awareness and cooperation of the local people in forestry activities.

NAFP can collect data from two principal sources: the project office and household surveys. Precautions have to be taken while collecting data to ensure that it is reliable, measurable, timely, available, accurate and replicable. The project office can provide information on inputs, outputs and direct effects; to assess indirect effects and long-term impacts, household surveys have to be carried out, as indirect effects and long-term impacts are related to the size of communities and take place over a long period.

Simple techniques of data gathering and analysis will be used rather than relying on sophisticated computerised techniques. Techniques of rapid observation, case studies and periodic reviews will be emphasized in order to cover the area which is outside the routine sample survey area. Monitoring should be undertaken in a thoroughly professional manner and for this the basic prerequisite is the development of an efficient record-keeping system within the project. But evaluation, in this case, should provide quantified analysis and interpretation of indirect effects and long-term impacts. Evaluation should be carried out by an independent research firm.

ABBREVIATIONS

ADB	Asian Development Bank
ADAB	Australian Development Assistance Bureau
APROSC	Agricultural Projects Services Centre
ANU	Australian National University
CCF	Chief Conservator of Forest
CF	Contract Forest
CFAD	Community Forestry and Afforestation Division
CFDTP	Community Forestry Development and Training Project
cu.m.	Cubic Metre
DFC	District Forest Controller
FAMSD	Food and Agricultural Marketing Services Department
FAO	Food and Agricultural Organisation
ha	Hectare
HMG	His Majesty's of Government of Nepal
Kabhre	Kabhrepalanchok
km	Kilometre
LFA	Logical Framework Approach
MFSC	Ministry of Forests and Soil Conservation
NPC	National Planning Commission
NAFP	Nepal-Australia Forestry Project
ODA	Overseas Development Administration
PF	Panchayat Forest
PPF	Panchayat Protected Forest
RF	Religious Forest

SATA	Swiss Association for Technical Assistance
Sindhu	Sindhupalchok
sq.km.	Square Kilometre
TOE	Tonnes of Oil Equivalent
UN	United Nations
UNDP	United Nations Development Programme
USAID	United States Agency for International Development

GLOSSARY

Nepalese Words and Terms

banpali	forest guard
bari	rainfed dry upland
chouri	a cross of yak and cattle
chautara	resting place
daura	firewood
jhikra	small dry wood
khaja	small snacks during the day
kharka	grazing land
khet	low land (irrigated or rainfed)
lek	area located on the ridges or on the higher slopes of mountains
naike	foreman
nak	female yak
panchayat	local village community
patkar	leaf litter
pradhanpancha	elected chief of village panchayat
sita pita	small dry wood
terai	flat land in the southern part of Nepal
yak	mountain cattle

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1

INTRODUCTION

1.1 Location

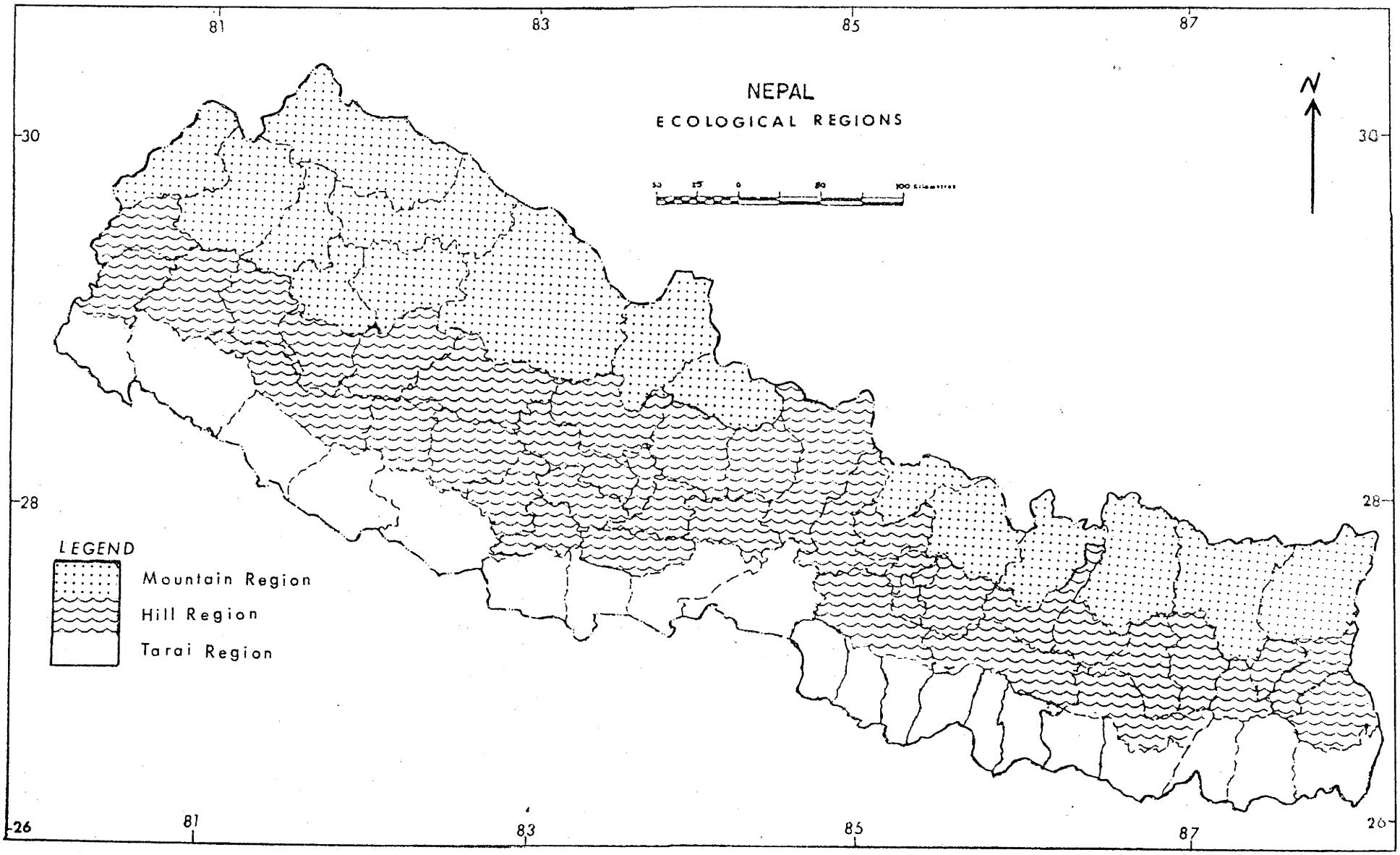
Nepal, landlocked between China and India, is one of the smallest countries in Asia with an area of 141 thousand sq. km. (World Bank 1984, p.218). Though small in area, it is divided into three parallel ecological zones: the Terai (60-300 metres above sea level), the Hills (300-3000 metres above sea level), and the Mountains (above 3000 metres) covering 23 per cent, 43 per cent, and 34 per cent of the total area respectively as shown in Figure 1-1 (ADB and HMG 1982, p.1).

Nepal's demographic situation is among the worst in the world and is deteriorating steadily (World Bank, 1979, p.35). The total population, 94 per cent of which is rural, was estimated at 15.4 million in mid-1982, with an estimated rate of population growth of 2.6 per cent per annum for the period 1980-2000 (World Bank 1984, p.260, 218, 254).

Nepal's economy is dominated by agriculture, the main source of livelihood for over 90 per cent of the population, which generates two-thirds of GDP and 60 per cent of all export revenue (World Bank 1983, p.1).

The different microclimatic conditions which depend upon elevation, aspect, cloud cover, slope, soil types, and rainfall provide a wide range of environments for plant growth. Elevation and aspect are the important factors in determing forest types in the Hills and Mountains, but in the Terai, soil types and rainfall determine the forest types. Thus, the forests in Nepal are of tropical and subtropical, temperate and alpine broadleaved, temperate and alpine conifer, minor temperate and alpine associations (Stainton 1972, p.56 and 57).

Figure 1-1


NEPAL
ECOLOGICAL REGIONS
N
81
83
85
87
30
28
26
LEGEND
Mountain Region
Hill Region
Tarai Region

1.2 Importance of Forest in the Economy of Nepal

The forest is a renewable resource which provides timber and other products for home and industry, food and cover for wild and domestic animals, protection of soil and water values (sources), and facilities for recreation (Meyer et al. 1961, p.3)

In Nepal forests are the main source of energy (fuelwood) for heating, cooking, fodder for livestock, and lumber for industrial purposes and domestic use. Total energy consumption in Nepal in the year 1980/81 was estimated at three million tonnes of oil equivalent (TOE), of which 94 per cent was from fuelwood (UNDP/World Bank 1983, p.2).

During the period 1970/71 to 1980/81 overall energy consumption in the non-commercial sector, that is, for the cooking and heating needs of households, has greatly increased (UNDP/World Bank 1983, p.2). The high dependency on fuelwood as the main source of energy is due to the relative cost and unavailability of other types of fuel in many parts of the country. The total energy consumed and types of energy used in households differs significantly between the Terai and the Hills, and between urban and rural areas. Individuals in the Hills consume more energy than their counterparts in the Terai because of the greater need for heating.

In urban areas fuelwood consumption is low in comparison to rural areas due to the availability of other sources of energy. Rural households consumed 98 per cent of fuelwood used in rural areas, and fuelwood supplied almost all household energy requirements. In urban areas better access to commercial fuels reduced the reliance on fuelwood to 83 per cent, with kerosene accounting for 10 per cent, electricity 7 per cent, and others less than 1 per cent of consumption (UNDP/World Bank 1983, p.2).

Due to the traditional nature of Nepal's economy fuelwood is an indispensible item for Nepalese citizens, but it is becoming scarce due to the continuous depletion of forests. In some areas the shortage of fuelwood has forced the rural population to burn either livestock fodder or animal dung to provide for minimum heating and cooking

needs[1]. Quantities consumed in 1974/75 were about 150,000 tons of fodder and 100,000 tons of dried animal manure (World Bank 1980, p.5). This represents a very small fraction of the total energy consumption, but the concern is that, if forest destruction continues, there will be more burning of livestock fodder and manure. Since farmyard manure is the main fertiliser for crops in the Hills, burning it will result in a decline in cereal production, due to reduced crop fertilisation[2]. This loss of food will create critical conditions for the people who live in the Hills. Similarly, the burning of livestock fodder will further reduce the availability of animal products for consumption and of draught power essential to agriculture.

Population pressure, also leads to constantly increasing demands for arable land and forest products. Thus accelerating population growth has increased the demand for fuelwood and has led to forest clearance to provide land for agriculture.

1.3 The Existing Forestry Situation

The present estimate of forest area is 3.8 million hectares (World Bank 1983, p.3).[3] This area represents about 27 per cent of the total area of the country. Of the total area under forest, 0.9 million hectares are estimated to be in the Terai, and 2.9 million hectares in the Hills (World Bank 1983, p.3).[4] The forests in the Hills and in the Mountains vary considerably in type. Fir and oak predominate at higher

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[1] In the Nepal-Australia Forestry Project area, however, this type of situation has not yet occured. Mahat (1985) has concluded that in the project area, the burning of dung and animal fodder is minimal.

[2] The World bank (1980, p.5) argued that in Nepal 'assuming an average dressing of 2 tons/ha of dry dung and a resultant increased yield of 300 kg/ha of grain, the burning of 8 million tons of dry dung somewhere between 1985 and 1995 (if the present rate of forest destruction continues) would represent a foregone annual production of over 1 million tons of foodgrains (25 per cent of current cereal production)'.

[3] ADB/HMG(1982) has estimated the present forest area of Nepal to be 4.1-4.5 million hectares according to land use data available for 1980. But the Ministry of Finance (1981) put the forest area below this figure. The staff appraisal report of Nepal Second Forestry Project prepared by World Bank(1983) estimated 3.8 million hectares.

[4] ADB/HMG (1982) has estimated the present forest area in the Terai to be 1.6 million hectares and the Hills 2.5 million hectares, according to the land use data available for 1980.

altitudes, Chir pine, Prunus, Castanopsis, Schima, Alnus and Sal at medium elevations and at lower elevations Sal is the most common type of forest. In the Terai, Sal and Asna hardwood varieties are to be found (World Bank 1983, p.3).

The total forest area of 3.8 million hectare may be further divided into non-commercial and commercial forests. Non-commercial forests are defined as inaccessible forests in subalpine, steep, or rocky terrain and forests reduced to scrub and shrubs by encroachment. The commercial forests are defined as accessible and exploitable forests. The break-down by area for these categories is not available.

1.4 Deforestation and its Impact on the Hill Economy

Nepal is located on the slopes and foothills of the geologically young Himalayan mountain chain. It is subject to powerful natural erosion processes due to the steepness of the mountains, types of soil and the concentration of annual rainfall. The forests on the Hills hold the soil, retain moisture and limit the erosion process. In the areas where forests have been destroyed, rain and melting snows have taken off the soil and deposited it at low altitudes in the Terai.

In the hill areas, use of the forests for fuelwood, fodder, and grazing by the villagers is a long-established custom. In most cases the use of forests for fuelwood, fodder, and grazing was managed by communal rules and regulations, and these customs have become the main cause of exploitation of forests in the Hills (UNDP/World Bank 1983, p.100). In the Terai, besides domestic use, forests were exploited to earn revenue for the government by selling commercially valuable timber.

In 1957, the Government nationalised the forests in order to maximise the revenue from timber and improve forest utilisation management. This step encouraged greater destruction of forests in the Hills than in the Terai, and as a result, communal rules ceased to apply in forest management. Instead, forest lands were cleared indiscriminately to collect fuelwood, timber, and fodder, and were later converted into agricultural land to prevent the government from taking ownership of the land. This type of indiscriminate cutting exacerbated the erosion problem.

The most critical problem arising from soil erosion is the loss of the topsoil which diminishes food crop production. This topsoil has helped to raise river beds in the Terai and ultimately has created flooding. Topsoil washed into India and Bangladesh is now Nepal's most precious export, but one for which it receives no compensation (Eckholm 1976, p.78). An estimated 240 milliom cubic metres of soil are lost every year (World Bank 1974, annex 6.2). Thus at present, Nepal is facing the World's most acute national soil erosion problem (Eckholm 1976, p.78). The environmental deterioration occuring now is not new but has been going on for centuries. However, the rate at which it is now occuring has not been seen previously. The main reason for Nepal's erosion problems are rapid population growth, without any basic changes in the traditional methods of exploiting the environment for human use.

1.5 Government Policy on Forests

The magnitude of environmental deterioration caused by soil erosion in the Hills and the rising river beds in the Terai, coupled with worsening shortages of forest products for local use, calls for innovative development approaches. In the phase of planned development, the Government has not usually realized the detrimental environmental effects of various projects. Only during the 1970s did the Government recognize the urgent need for ecologically sound development.

The National Forestry Plan of 1976, and its first amendment in 1977, was the first attempt to initiate comprehensive forest development, and this plan emphasizes the importance of improving the productivity of Nepal's forests. It also recognizes the necessity of community forests for meeting local demands for fuelwood, fodder and other forest products for domestic use. The plan gives priority to those projects which put emphasis on community participation in the protection of existing forests, development of new forests and projects that will increase the availability of forest products.

The guidelines for forestry development were fixed by the National Planning Commission in the Sixth Plan (1980-85). The guidelines also reflect the policies outlined in the National Forestry Plan. Both plans (Sixth Plan and National Forestry Plan) stress the importance of community forestry development and afforestation programmes for maintaining a steady supply of forest products for domestic use.

The Nepal-Australia Forestry Project (NAFP) and the Community Forestry Development and Training Project (CFDTP) are the major projects in the forestry sector of Nepal. The projects were launched in the Hills with the aim of increasing the supply of fuelwood in the Hills areas, by establishing new plantations and rehabilitating degraded forests. With the success of the projects, in terms of achieving people's participation in the idea of community forestry, the third and second phase of the NAFP and CFDTP respectively are underway. The projects will concentrate on increasing supplies of fuelwood, poles, timber, and fodder by establishing 'Panchayat Forest' (see below). Further, it will encourage farm and other plantations, strip plantations, wood lots and larger scale plantations by improving areas of natural forest.

1.6 Forestry Institutions

The Ministry of Forests and Soil Coservation (MFSC) has overall responsibility for forestry and natural resource conservation.

Within MFSC there are six departments and three corporations. The Forest Department, under the management and technical direction of the Chief Conservator of Forests (CCF), is responsible for the overall administration and management of national forests.

The Forest Department has five Regional Forest Directorates under whom are seventy-five District Forest Controllers. The Community Forestry and Afforestation Division (CFAD) of the Forest Department is concerned with the development of community forests in the Hills and with the initiation of large-scale plantation projects in the Terai.

The District Forest Controllers (DFCs) are responsible for implementing CFAD's forestry programmes, with additional support from CFAD's five units: Community Forestry Unit, Monitoring and Evaluation Unit, Motivation and Education Unit, Stove Improvement Unit and Afforestation Unit.

The NAFP, which is under the jurisdiction of the Central Region Forest Directorate, is managed jointly by the DFCs of Sindhupalchok and Kabhrepalanchok (henceforth called Sindhu and Kabhre respectively) districts and the Project Manager (expatriate staff). The DFCs represent His Majesty's Government (HMG) while the Project Manager

represents the Australian Development Assistance Bureau, the funding agency.

1.7 Types of Forest

Realising the importance of the participation of local people in maintaining and protecting the forest, the Government on September 7, 1977 enacted the Forest (First Amendement) Act. Under this act 2.2 million hectares of forests (UNDP/World Bank 1983, p.80) became the responsibility of local village communities (panchayats), and private individuals or agencies, for management and protection. The new act divided these forests into four different categories:

Panchayat Forests (PF) cover barren and denuded forest-land handed over to panchayats by the Government for reforestation or planting. The planting is done by panchayats under the technical guidance of the Department of Forestry. Panchayats do not own the PF but receive revenue derived from PF, on the condition that 50 per cent of the revenue will be used to manage the forest. PF must be planted and protected within five years of being handed over to panchayats by HMG. The limit on PF land is 125 hectares per panchayat. Here panchayat refers to village panchayats which usually cover an area having 3000 to 6000 residents (NPC 1965, p.10).

Panchayat Protected Forests (PPF) are degraded forests given to panchayats by the Government for the purpose of protection and proper management. Though some gap-planting is done, greater protection and management will certainly help to rehabilitate the forest. Also in this case the panchayat does not own the forest, but 75 per cent of revenue earned from it is credited to the panchayat and 25 per cent to the Government. PPF, like PF, has to be planted and protected within five years of being handed over to panchayats by HMG. The limit of PPF land is 500 hectares per panchayat.

Religious Forests (RF) are degraded forests given to religious institutions for the purpose of protection and proper management. The religious institutions do not own the forests but, as in PPF, 75 per cent of revenue from the forest is credited to the religious institution while 25 per cent goes to the Government.

Contract Forests (CF) are denuded Government forest lands which

can be leased out to individuals or agencies on prescribed terms and conditions for reforestation and production of forest products. The Government has not yet been able to work out detailed terms and conditions for granting leases.

The NAFP is stressing the importance of PF and PPF, as more planting as well as better management of the existing forest is possible only with decentralisation of responsibility to panchayats. The transfer of forests to panchayats will be accompanied by the provision of seedlings, extension and technical assistance.

1.8 Objective of the Study

Unplanned and unsystematic deforestation is causing hunger and general decline in the economic situation of rural families. Generally, a forestry project by its nature has a long gestation period from the time of planting to the stage of maturity. Thus periodic monitoring and evaluation of a project helps to get it back on track, should it deviate from its objectives. Monitoring generally, occurs during implementation and its primary purpose is to aid in the management of the implementation process itself. Evaluation is done after the completion of the project.

The NAFP is one of the afforestation projects launched in Nepal with the aim of stopping the deterioration of economic and environmental conditions in the Hills. Involvement of the Australian Government in forestry in Nepal began in 1962 with NAFP stage one, but until the commencement of NAFP stage two (NAFP-2) in 1978 the involvement was on a rather ad hoc basis. NAFP-2 was administered by the Department of Forestry (DF) of the Australian National University (ANU) on behalf of Australian Development Assistance Bureau (ADAB).

The project had the following objectives:

1. assistance in implementing the National Forestry Plan in the Chautara Forest Division
2. contribution to training and education in forestry for Nepal
3. the construction of an adequate seed storage and testing unit in Kathmandu (ANU 1981, p.1).

NAFP-2 was initially completed in October 1984, but has been extended to December 1985. The NAFP stage three (NAFP-3) is due to

start in Janaury 1986 and to run for five years. It will be incorporated in HMG'S Seventh Five Year Plan (1985-90). Detailed discussion of the project is in Chapter 4.

The objective of this study is to draw up a set of guidelines for monitoring this project in the future. Given the limited statistical information available about the project, the sub-thesis will be restricted to:

1. the explanation of the relationship between the forestry project and the agricultural system of the Chautara region
2. identification of the costs and benefits of the project (including the social costs and benefits)
3. providing a procedure or technique for monitoring and evaluating costs and benefits.

1.9 Outline of the Study

The interaction between the agricultural system and the forest in the project area is examined in Chapter 2.

The system of monitoring and evaluation of agricultural and rural development projects developed by the World Bank and the Food and Agricultural Organisation (FAO), and the monitoring and evaluation procedures for integrated rural development programmes developed by the United Nations Development Programmes (UNDP) are discussed in Chapter 3.

Chapter 4 describes the physical and demographic characteristics of the project area, describes agricultural and livestock systems, and discusses the design and operation of the phases of NAFP.

The detailed monitoring and evaluation system for NAFP-3 built around the logical framework of the project is presented in chapter 5.

CHAPTER 2

INTERACTION BETWEEN AGRICULTURAL SYSTEMS AND FORESTRY IN THE PROJECT AREA

2.1 Introduction

The forest economy of the Hills of Nepal cannot be discussed in isolation from other rural activities, as it is intimately connected with the cropping and livestock systems. Crop production, livestock and forestry are closely integrated into a farming system, each supporting the other. Mahat (1985, p.68) concluded that a change in one of the components of the farming system will have significant implications for the others.

The major products of the forests are not traded and each forms an integral part of the Hill economy. Forests directly provide fuelwood, poles for timber, imperata grasses (for roofing), fodder (grasses and leaves), and grazing land for livestock. Forestry also contributes to agriculture by controlling erosion, conserving water supplies, and providing shade and shelter. Thus forestry in the hill economy plays a pivotal role in human sustenance by contributing to almost all of the farmers' activities.

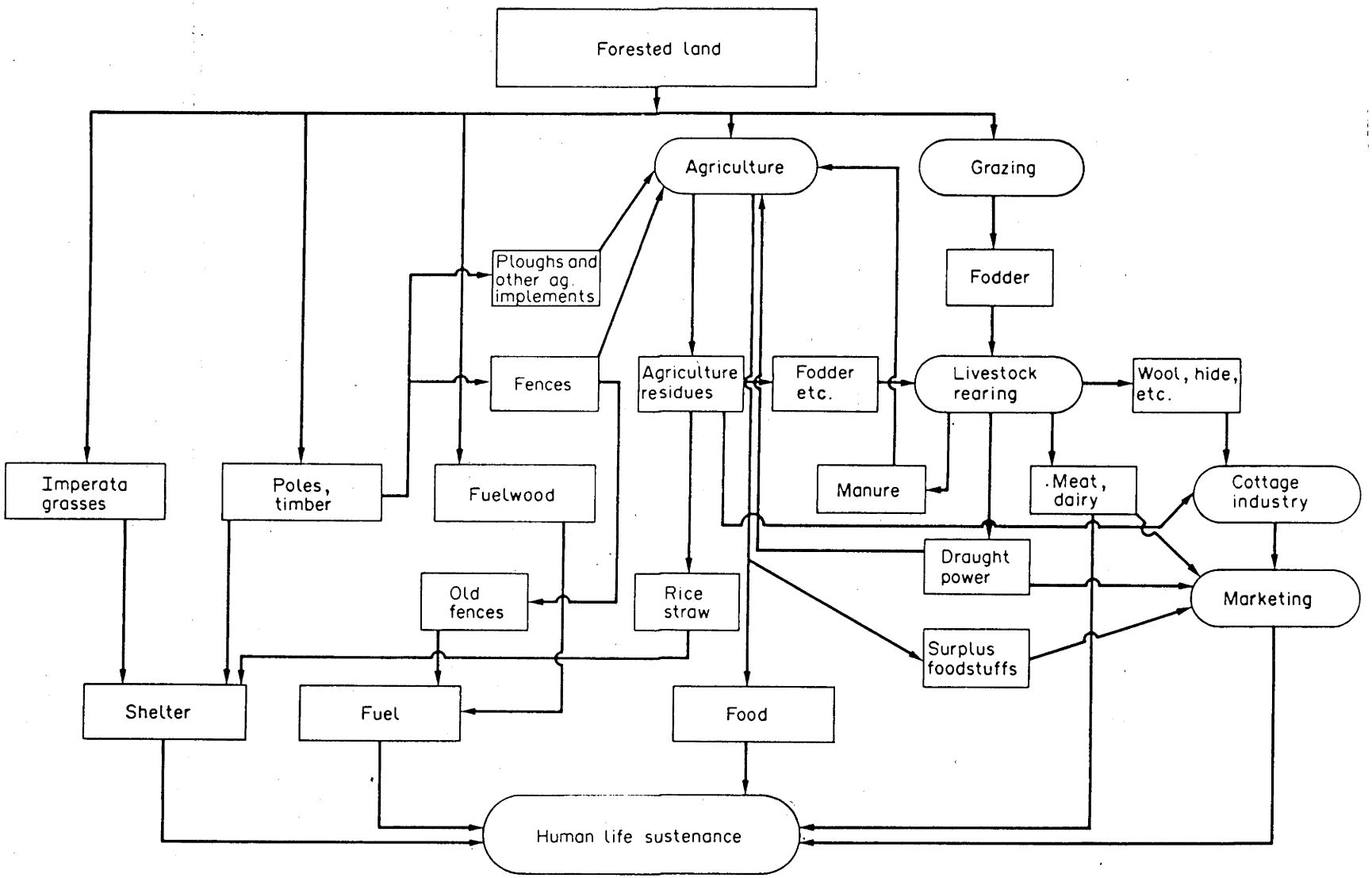
Figure 2-1 prepared by Bajracharya (1983) shows the linkages between forested land and other rural activities for the maintainance and stablity of human life in the Hills. The figure is a good schematic representation of the Hill economy in the project area.

2.2 Agriculture

The contribution of forestry to the maintenance and expansion of agriculture is not a new phenomenon, but, as a result of the rapid depletion of forests, the importance of its contribution to agriculture and to the relief of rural poverty is now being appreciated.

For a majority of those who live in rural areas, agricultural

Figure 2-1: FOREST LINKAGE TO HUMAN LIFE SUSTENANCE



Source: Bajracharya, 1983.

development has become synonymous with rural development. Rural development is defined as improving the living standard of the mass of the low income population residing in rural areas and making the process of their development self-sustaining (Lele 1975, p.20). The initial stages of rural development focus on the provision of basic minimum needs in food, shelter, and clothing, of which food is the most vital.

New agricultural technologies and innovations in farm practices are pre-conditions for agricultural development. Technological innovations can be achieved through mechanisation, and biological/chemical innovation through the introduction of high yielding varieties of seeds, and changes in farm practices.

Mechanical innovation is not suitable for the hills of the project area where parcels of land are small and scattered, capital is scarce and labour is abundant. Biological/chemical innovations which stress the use of high yielding varieties of seed, new chemical fertilisers and the provision of irrigation facilities can improve the quality of the land and help to increase yields per unit area. But currently there is an absence of widescale agricultural extension services, provision of improved seed and fertilisers. Although it is hard to quantify, informal irrigation prevails in the region, but formal irrigation (established canals) supplies about 592 hectares of land in the project area (Aryal et al. 1982, p.319 and 329).

These irrigation facilities are confined to the lower plains, and the rate of fertiliser and chemical use is very low and confined to limited areas and particular crops. Thus farmers can not rely on this type of innovation because of the shortage of cash, lack of knowledge, and insufficient irrigation facilities. Further, the topography itself is an obstacle to the spread of agricultural extension services. Hence the prospects for increasing the yield per unit area are bleak.

The main option for increasing output is through increasing the area of land under cultivation, and this can only be done by forest clearance. This option is not available in the NAFP area because all land that could conceivably be brought under cultivation was so converted years ago. However the relationship between forests and grain production is shown in Figure 2-2 below. This shows that forests

and agriculture are two components of the hill economy, where the output of forests becomes an input to agriculture or grain production. Forest products such as firewood, timber, and medicinal plants assist human sustenance and improve the quality of labour, which in turn is an input into grain production. Fodder and bedding improve the conditions for the cattle which provide manure/litter and draught power for agriculture. Similarly the forest provides wood for agricultural equipment and tools. The forest also helps to control erosion and provide compost. Better forests will result in increases in permanent sources of water and nutrients for soil, which will increase grain production.

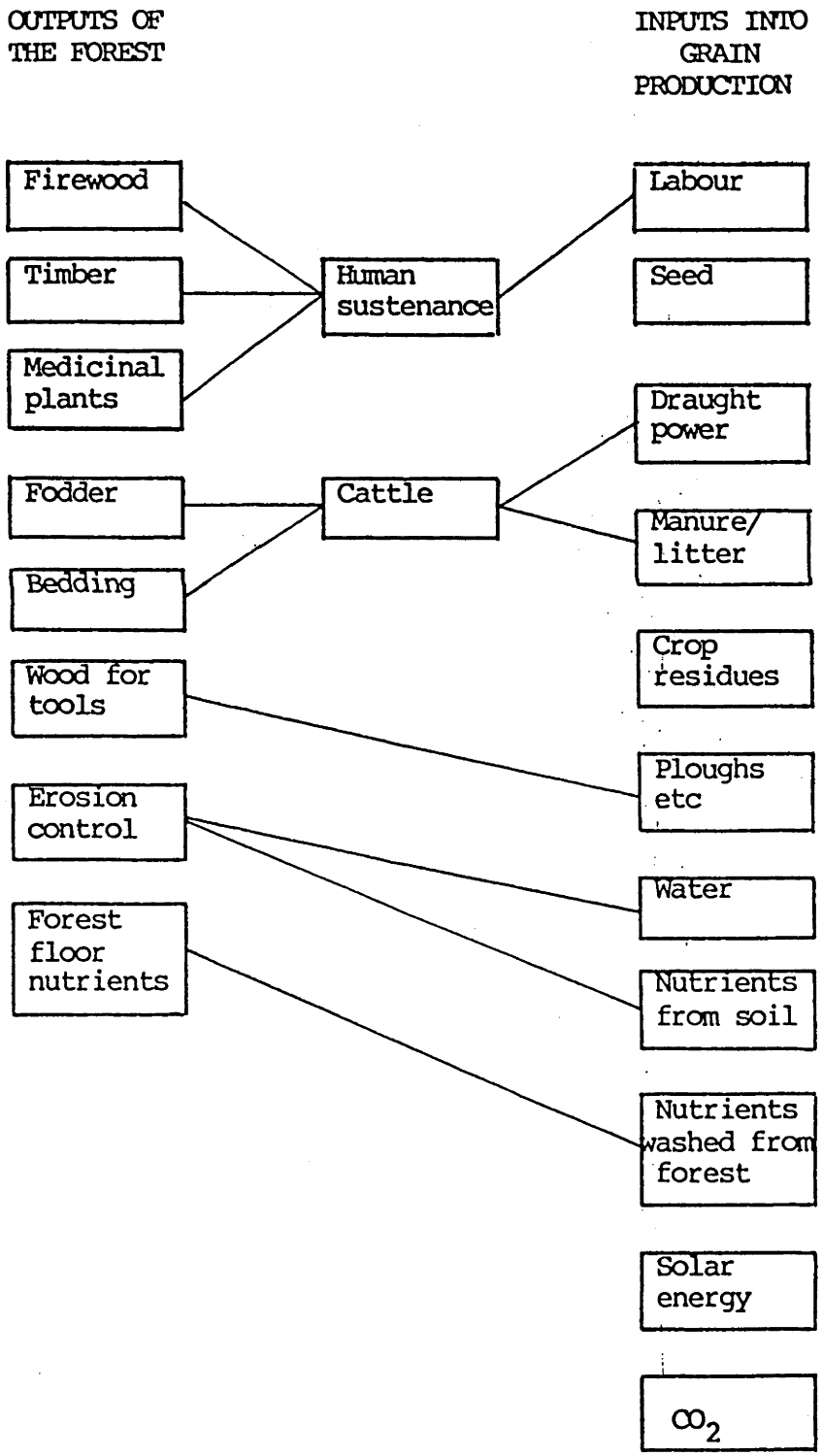
However the forest in the project area is under great pressure from expanding agricultural land, due to the excess of population on the available agricultural land. Mahat (1985, p.344) concludes that deforestation in much of the hills, and certainly in the project area, was caused by the joint effects of government land use policy and subsistence agriculture. This pressure has led to deforestation, causing considerable problems from soil erosion. As a result there are losses of topsoil, a loss of potential agricultural lands, drying-up of mountain streams, and severe downstream flooding and sedimentation.

Deforestation has also led to hunger and a general decline in the economic situation of families. Top soil washed down on to agricultural land in the valley demands more physical work with less satisfactory results, in the long run causing destruction of farmsteads and human dislocation. Thus deforestation is weakening the very basis of the hill economy. Mahat (1985, p.344) further concludes that in the project area there is now no forest land suitable for conversion to agriculture and the situation has been the same for many decades, probably for more than a century.

2.3 Energy

Almost all the energy requirements of households are supplied by wood, and in some areas additional energy comes from vegetable wastes, animal dung, and livestock fodder. In many areas, due to deforestation, villages are finding it more difficult to gather firewood. Time required to collect firewood varies from place to place, and New Era

Figure 2-2: RELATIONSHIP BETWEEN FORESTS AND GRAIN PRODUCTION



(1981) concluded that time required to bring a load of firewood increased during the last ten years in all panchayats of the project area. A labourer from Chautara bazaar (location site of NAFP office) spends eight to nine hours now to bring in a load of firewood; this was just four to six hours ten years ago. But in other panchayats, a labourer spends five to six hours now, compared to four to five hours ten years ago.

In Eastern Nepal, Bajracharya (1983) has concluded that the time required to collect one bundle of firewood from the forest is four or five hours or longer. Similarly, the National Academy of Sciences (1980, p.1) concludes that gathering firewood is now an entire day's task in some mountain villages of Nepal; a generation ago the same expedition would have taken an hour or two. Further, Bajracharya (1983) has suggested that this time is used as a 'socialisation opportunity to many residents'. The collection of firewood which depends upon the availability of labour is more than socialisation; more time spent collecting firewood means less time available for productive work.

As a result of the continual depletion of forests, people are spending more time collecting firewood, time which could be used in other more productive ways. 'Energy usage by families in Nepal is barely sufficient to cook two meals per day and to provide a small amount of general heating' (Griffin 1978, p.1). Similarly FAO (1978, p.6) argued that in the uplands of Nepal only vegetables which can be eaten raw are grown.

There is great variability in the estimations of fuelwood consumption [1]. The estimate by New Era for the project area is too low, and such a low consumption of fuelwood would lead to burning of either fodder or animal dung. But this type of situation is rare in the project area, as Mahat (1985) argued. The low estimation by New Era may be due to a survey covering only six panchayats, including Chautara. In Chautara due to scarcity of fuelwood, consumption might be low. Mahat

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[1] New Era (1980) has assumed 0.36 cu.m. per capita annual consumption of fuelwood in the project area. Donavan (1981) and Wyatt-Smith (1982) have assumed 1.0 and 1.2 cu.m. per capita consumption of fuelwood in other hill areas of Nepal.

(1985, p.204) confirmed that the assumed weight of a headload by New Era was too low, and as a consequence so was estimated consumption. The estimate of Donavan is also unsatisfactory, and she has pointed out many sources of error which are the cause of variability in the per capita consumption of fuel. Additionaly, actual levels of consumption do not indicate desired levels. The variability may be due to differences in ethnic group, local climate, access to firewood stands or availability of other alternative source of energy. Furthermore estimation differs with the purpose of the study, and has to be done correctly, so that it is reliable and applicable to other areas. It is an extremely important task, as domestic fuel is a fundamental requirement of the household. Meeting the demand for fuelwood is vital for maintaining and improving rural living standards in the Hills of Nepal. It is reasonable to assume fuelwood consumption of 1.2 cu.m., as estimated by Wyatt-Smith. The annual demand for firewood for the population of 531,670 comes to 638 thousand cu.m., about 510 thousand tonnes.

The accessibility and end uses of fuelwood are shown in Figure 2-3 by Bajracharya (1983), this diagram is applicable to the hills of the project area. Currently, in the project area, the local people obtain their firewood from three sources: private woodlots (privately owned-land), public forests and homestead surroundings. Homestead surroundings provide dried animal dung as well as crop residues, which include maize and millet stalks, maize cobs, bamboo, dried stems of wheat, mustard seed, hay, husks, and sugarcane peels. Collectively these are called Jhikra-Jhakri abbreviated to Jhikra[2]. Jhikra is mostly used in the monsoon season (June-July) when fuelwood collection cannot be done and stocks have run out, or to save stocks if the rain becomes prolonged. In most of the area, people use both Daura (firewood) and Jhikra together to cook food in the morning and evening, but only Jhikra to prepare Khaja (small snacks during the day).

Daura (firewood) is collected either from private woodlots or from public forests. People collect two types of Daura, wet wood (green) and dry wood (dead branches or other dead wood), depending upon the time of

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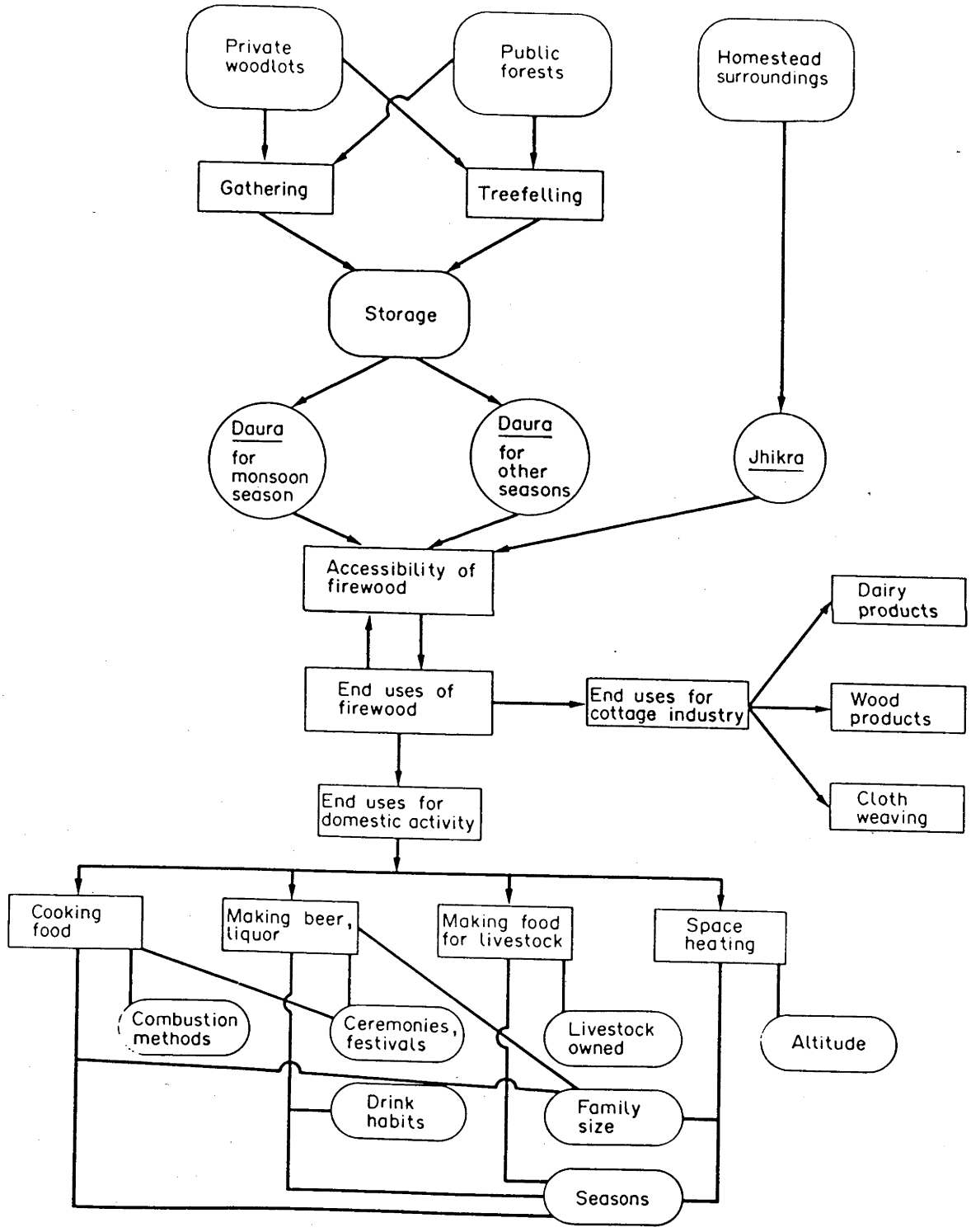
[2]In some panchayats these are also known as Sita-Pita.

Figure 2-3: ACCESSIBILITY AND END USES OF FUELWOOD



Source: Bajracharya, 1983.

use. Dry wood is collected to satisfy their immediate needs and wet wood is collected for later use. Daura is collected from forests by gathering or tree felling.

In accordance with new legislation, the private woodlots in the project area can be classified as contract forest as well as private plantings, because these forests are beyond the control of panchayats. The public forests are the PF and PPF under the control of panchayats.

Firewood is used to cook food, for heating and lighting, for cottage industries like dairy production, manufacture of wood products and cloth weaving and for preparing animal food. Thus, the amount of firewood used depends upon cooking habits, taste, combustion methods, family size, livestock owned, location, ethnic group, season and social attitude. In addition firewood is used in religious ceremonies such as cremetions. Thus the whole rural economy is heavily dependent on firewood, and overcutting of trees is occuring everywhere.

Agriculture is not the only reason for the destruction of forests in the project area. Additional destruction of forests has occured through the practice of tree-mining (cutting down all the trees closest to human settlements, rather than selective cutting throughout the forest). This may be due to the very primitive methods used for cutting trees in rural areas. Currently the common situation is that all of the forest around each village or town has disappeared.

The shortage of fuelwood in the project area has led to greater use of fuels from homestead surroundings. Dung and residues are the traditional manure which improve nutrient levels, and it has been estimated that one ton of cowdung burned results in a loss of about 50 kgs of food grain (Spears 1978, p.4). Crop residues also act as a mulch which protects the soil from the impact of heavy rain storms and reduces sheet erosion.

The reduction in animal dung and crop residues used as manure and mulch encourages further encroachment on forests, in order to bring more land under cultivation. This creates further soil erosion which puts further pressure on agriculture and forests. Mahat (1985, p.208) argued that in more recent times, however, fuelwood gathering was certainly a factor in forest degradation, particularly near villages.

2.4 Fodder

Forests in the project area, are also being consumed for animal fodder (grass and leaves). Due to the very small size of holdings, people rely heavily on livestock as an alternative source of food and income. Wormald (1976) has estimated the fodder demands of different species of livestock. Buffalo will eat up to 40 kg of fodder per day, oxen 25 kg per day, cows 20 kg per day, and goats and sheep 3 kg per day. While various studies[3] have estimated different levels, the estimates made by Wormald seem to be most realistic. The estimated annual demands for fodder by different livestock species are given in Table 2-1. Cattle are assumed to eat 25 kg of fodder per day. Annual demand is calculated over 365 days a year,

Table 2-1: Estimated Annual Demand for Forest Fodder by Livestock Species in the Project Area

Species	Number (000)	Annual Demand (tonnes)
Cattle	188.39	1,719,068
Buffaloes	92.87	1,355,902
Sheep and Goats	238.53	261,190
Total	519.79	3,336,160

Sources: Aryal et al. (1982, p.316, 326) for livestock numbers.
Wormald (1976, p. 12) for annual demands.

thus, the annual demand for fodder is about 3,336 thousand tonne per year, six and half times the demand for firewood.

Both stall feeding and grazing of livestock are common practices in the project area. Stall feeding is done by giving livestock grasses and tree-leaf fodder collected from agricultural fields and forests by the farmers; while grazing by animals generally takes place in forest, shrubland and grassland. Stall feeding is practised because of the

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[3]Fleming (1978) has estimated 27 kg of tree foliage and 45 kg of fodder per day for buffalo, 12 kg of tree foliage and 30 kg of fodder per day for goats and sheep. New Era (1980) has estimated 43 tonnes of fodder per household for stall feeding of livestock.

shortage of grazing land and a shortage of labour to look after livestock. However, total stall feeding of all the livestock in some areas is impossible because of inadequate, collectible fodder supplies. In these areas less labour is required by allowing livestock to graze.

Fodder is obtained from agricultural by-products as well as grasses, trees and shrubs. At the time of the moonsoon, when all agricultural lands are occupied by crops, the livestock are fed in stalls or sent to the Kharkas (grazing land) or forests for grazing. Generally cattle and buffaloes are stall-fed in the monsoon period. In the monsoon period different types of fodder become available both for stall feeding and grazing; but in the dry season, the forest becomes the only source of fodder for livestock. New Era (1980) confirmed that forests are an important source of fodder in the project area. Fodder is also used as bedding for stall-fed animals, but quantification is very difficult. We can agree with Mahat's (1985, p.333) statement that, in absolute terms, the use of the forest area for fodder of all sorts is therefore likely to have been the second most important cause of deforestation, after land clearing for agriculture.

From the point of view of forest regeneration, the method of collecting fodder is harsher than that used to collect firewood. Trees are chopped down in a way that prevents regrowth. Similarly, when animals graze in the forests, they eat not only grasses but also young saplings and disturb other trees with their movements. Mahat (1985, p.210) confirmed that the quantification of such disturbance in the project area is not possible, but casual observation suggests that the effects of uncontrolled browsing by goats are serious. Further cattle movement also destabilizes the soil and contributes to erosion. Deforestation then contributes to the undernourishment of livestock and leads to a decline in their number, this reduces manure production which is critical to agriculture. Thus increased fodder production is essential to sustain the numbers of livestock.

CHAPTER 3

A REVIEW OF MONITORING AND EVALUATION METHODS

3.1 Introduction

This chapter briefly reviews the development of monitoring and evaluation methods. Monitoring and evaluation methods have been specially designed for projects undertaken in developing countries by various funding agencies, such as the World Bank, the Food and Agricultural Organisation (FAO), the United Nations Development Programme (UNDP), the United States Agency for International Development (USAID), the Overseas Development Administration (ODA), and the Australian Development Assistance Bureau (ADAB). The following monitoring and evaluation method was initially developed for integrated socio-economic development projects, but it has been applied to various projects of a different nature. The salient features of the method are explained in this chapter.

3.2 Development of the Monitoring and Evaluation Method

Monitoring and evaluation started when international organisations like the World Bank, and the UNDP began to emphasise rural development programmes in less developed countries, with the hope of eliminating poverty, social inequality and unemployment.

A development programme is defined as a form of organised social activity with a specific objective, limited in time and space, and consisting of various projects of minimum size, in specific locations (Goodman and Love 1979, p.1). Further, a programme usually refers to an activity concerned with quite specific objectives, which consists of various other smaller programmes (Alberts 1970, p.1). So, a programme is a planned complex of activities with a sequence of subunits called projects. Projects are the 'cutting edge of development' (Gittinger 1981, p.1). The projects within a programme are linked to each other in

either a causal or supportive way. In the case of causal linkages, a project produces the inputs or preconditions which will help the functioning of other projects. In a supportive linkage, one project supports the effects and impact of the other, and vice versa. So the programme outputs, effects, and impacts are obtained through the operation of various projects in that programme. Usually, however some of the outputs, effects, and impacts are unintended.

When rural development programmes first started, problems were encountered in implementation procedures due to poor preparation and poor feedback of information within the programme. Each project within the programme was required to strictly follow the project cycle defined by the World Bank, and the cycle was divided into stages of identification, preparation, appraisal, implementation and completion. Monitoring occurs in the implementation stage, while evaluation occurs during the completion stage (Casley et al. 1982, p.8). The first three stages precede actual project activities in the field, and monitoring and evaluation will succeed only if they are planned and provided for in the first three stages.

A crucial phase in monitoring and evaluation is the collection of data, followed by analysis and reporting to management. The project cycle requires different sets of data which have to be collected from different sources. All the information required for monitoring is collected from within project activities, either as a part of regular reporting processes or as the result of special enquires mounted from within the project. For evaluation, the data required are from post-project surveys and case studies. Generally evaluation is done by persons from outside the project, in order to ensure a fresh and unbiased viewpoint, and makes use of data collected during other stages of the project.

Since the late 1970s more emphasis has been placed on monitoring and evaluation, and these terms have become widely used in the literature on programme planning, implementation and review. Monitoring and evaluation refer to the periodic examination of activities of projects and programmes in order to prevent deviations from the prescribed goals. Though monitoring and evaluation have been applied to a wide variety of projects, there are features common to

every project. The common features are the targeted population within the project area, the local people's acceptance of the project, types of beneficiaries (e.g. small or large farmers), changes in community outlook, performance of the technological package, and adaptability of the project.

NAFP is not a project within a programme but stands alone. Being the first community forestry project implemented in the Hills of Nepal, it has influenced many other forestry projects in other parts of the country. As a separate and independent programme, it has influenced in both causal and supportive ways the functioning of other forestry projects in Nepal.

3.3 Definition of Monitoring and Evaluation

Though monitoring and evaluation are frequently used as synonyms, they actually refer to different activities and processes (UN 1978, p.2), and these two terms are separately defined.

3.3.1 Monitoring

The term 'monitoring' is defined as the process of routine, periodic assessment of:

- the provision of information and the use of that information to enable management to assess the progress of implementation
- inputs, objectives, and outputs
- conditions and complementary activities that are critical to the success of the project
- procurement, delivery, and utilization of resources
- work schedules (whether the work will be finished in time or not)
- the relationships between inputs and outputs
- the constraints on and support for programme performance.

Monitoring helps to indicate short-comings or draw-backs in the programme process model, so that they can be remedied as quickly as possible. This is thus the most important device for improving programme management. It uses benchmark information which should be collected during the design and preparation phase, and continues

throughout the project's lifetime and includes the comparison of this information against original objectives and standards. It alerts project management and policy-makers to problems requiring corrective action and it may provide the necessary information for the investigation and preparation of an on-going evaluation. A monitoring system seeks to answer the question: What are the current costs and benefits of the project? Is the project achieving its aims? Monitoring generally occurs during implementation and its primary purpose is to aid management in the implementation process (Cracknell 1984, p.31). Cain and Hollister (1972, p.110) consider monitoring as a process of evaluation which addresses the question: Given the existence of a programme, is it being run honestly and administered efficiently?

Monitoring of NAFP will serve more purposes than these. The nature of the project is such that some aspects in the development of the project are presently unknown. In particular, the course of the project will depend on generating information about, and an understanding of, social systems for managing forest resources at a local level. It will also be important to monitor the impact of the project on aspects of economic life such as usage of forest products, affects on livestock and disposition of labour-time. The monitoring system of NAFP will have its boundaries drawn wider than the fairly narrow management-oriented system defined here. We want to monitor the above aspects (inputs, outputs, procurement, work schedules) and the wider impact of NAFP on the agricultural and livestock systems through which it influences the daily lives of residents.

3.3.2 Evaluation

The term 'evaluation' refers to a process by which programme inputs, outputs, effects, and impacts, both intended and unintended, are analysed against explicitly stated norms. That is, evaluation is concerned with the performance of the project. The norms of the project are the stated programme objectives, work schedules, and budget. Normally evaluation is undertaken after a project has been running for some time or after completion. Cain and Hollister (1972, p.110) classify this as 'outcome evaluation'. Evaluation is primarily concerned with recording the lessons learnt from project experiences, in order to benefit other similar projects undertaken in the future.

Evaluation not only aims to quantify the achievements, but also to assess the role of the project in obtaining these results and looks at both the beneficial and detrimental changes. Evaluation thus provides a basis for further planning and programme refinement. UNITAR (1969, p.142,143) characterises the process of project evaluation as a continuously functioning monitoring mechanism, sequentially interrelated and adapted to the life cycle and nature of a particular project.

The UN (1978) has distinguished three types of evaluation - ex-ante, on-going, and ex-post.

Ex-ante evaluation is undertaken before programme implementation to assess the developmental needs and potential of the target group or region. That is, this evaluation is the study of the project area, types of beneficiaries and the existing economic and social situation in the project area before implementation of the project.

On-going evaluation is the continual analysis of outputs, effects and impacts during the implementation phase. This evaluation provides project management and policy makers with information necessary to enable them to assess and adjust policies, objectives, institutional arrangement and resources affecting the project during its implementation. On-going evaluation studies may also be used for the preparation of projects in other regions. It contributes to flexible adaptation of the programme to accommodate changes and to the detection and cure of deficiencies.

Ex-post evaluation refers to analysis after completion of a project. That is, the project's achievements are compared with the project's stated objectives, and the effects and impacts of the programme in the area are assessed. The analysis is carried out using the information provided by monitoring and on-going evaluation. Sometimes supplementary special studies are needed. The purpose of ex-post evaluation is to provide analytic information for future planning and to inform donors and the general public of project results. The depth of the analysis and the nature of the reporting should depend on its potential usefulness.

The three types of evaluation show that evaluation has two essential dimensions. Firstly, it is concerned with information about

the programme itself and the would-be beneficiaries. Secondly, it is concerned with judgements made by the people who carry out evaluation.

Evaluation has been conceptualized in two models: goal attainment and system attainment models. The goal attainment model measures the degree of success or failure encountered by the programme in reaching pre-determined objectives (Schulberg, 1977 p.56). This model starts first by setting goals and evaluating the progress and achievement of the project. The system-attainment model is concerned with establishing a working model of a social unit in achieving a goal or a set of goals (Schulberg, 1977 p.59). Thus the system model is that of a multifunctional unit. The model, in order to achieve the stated goals, should emphasize the effective coordination of organizational sub-units, the acquisition and maintenance of necessary resources, the adaptation of the organisation to the existing environment, and to its own internal demands. So rather than concentrating its whole effort on analysing goals, it emphasizes analysis of the process of achieving goals. Instead of identifying goals and studying whether goals are achieved or not, as in the goal attainment model, the system attainment model analyses the effective allocation of inputs.

Evaluation of NAFP goes further than the goal and system attainment model. NAFP has the purpose of motivating and informing people of the importance of protecting common forest property and of sharing benefits equally. Evaluation of NAFP must also be concerned with the knowledge and attitude of local people towards social forestry. Since a social forestry project has a long gestation period, its effect on the agricultural and livestock systems, the environment, and on the pattern of forest product usage is difficult to determine. While, NAFP-3 has an implementation period of five years, the trees planted during this period will only start giving results after 10 years 15 years. Evaluation will need to focus largely on technical factors which allow predictions of incremental supplies of forest products in the future. Proxies for measuring the success or otherwise of social forestry projects have not been developed hitherto, and part of the purpose of this thesis is to explore this area.

3.3.3 The Relationship Between the Programme and Monitoring and Evaluation

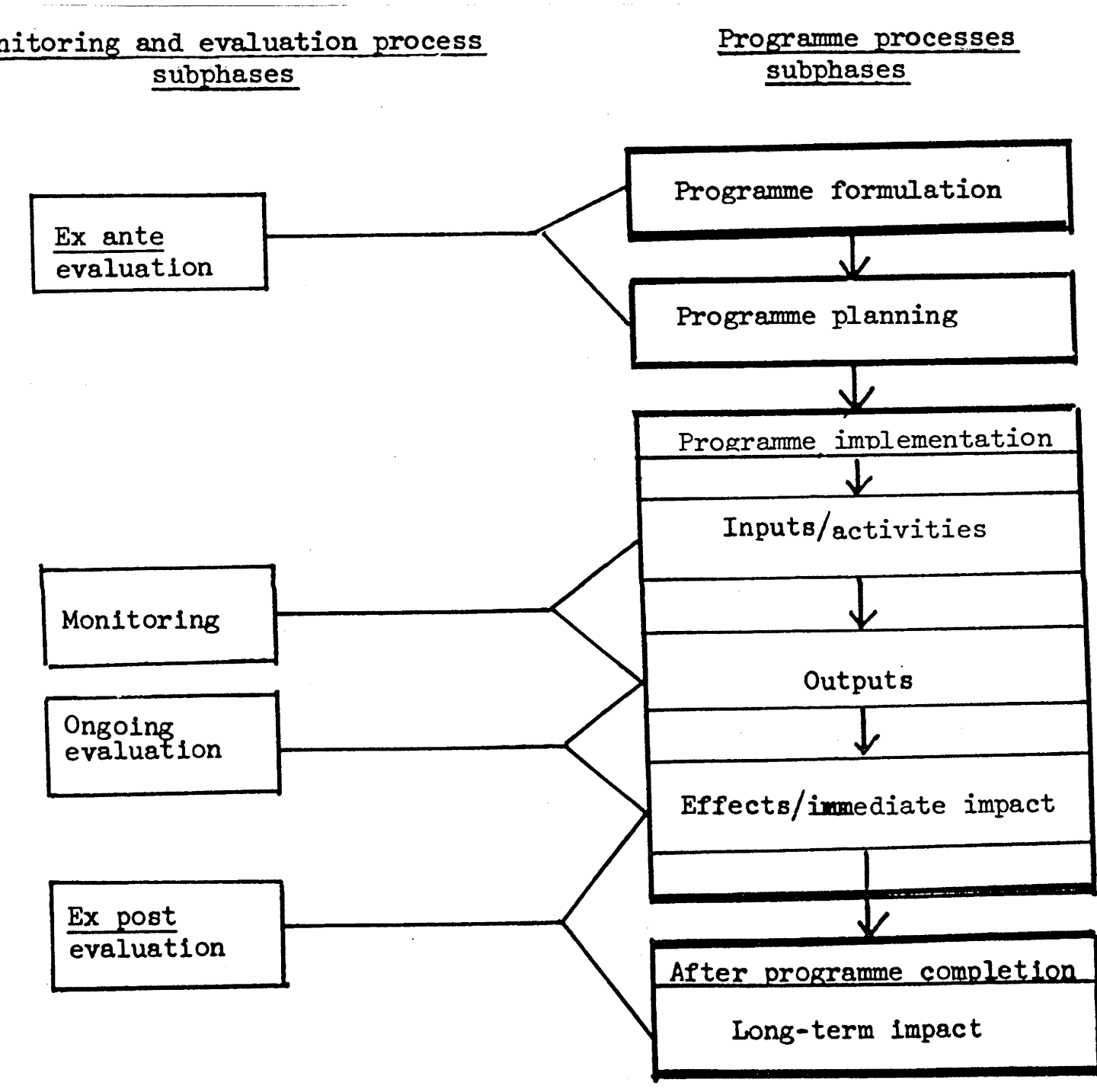
Monitoring and evaluation are normally separated in time and have different preoccupations: monitoring with a particular project's implementation, and evaluation with its performance (Cracknell 1984, p.31). The roles of monitoring and evaluation also vary with the nature and timing of the project. A project with a short life-span may need careful monitoring rather than an emphasis on evaluation. Because this type of project starts producing result quickly, any delay in supplying inputs hampers attainment of project goals. So careful monitoring is necessary. In research projects, however, evaluation becomes necessary as it is more difficult to monitor results. But, in the case of NAFP, having a long life-span and also being a research project, there is need for both careful monitoring and thorough evaluation.

As a research project, NAFP is concerned with the following: adaptability of planted species of trees to the existing physical environment, and acceptance of the species by the local people. Evaluation is necessary here.

The relationships between sub-phases of the programme (formulation, planning, implementation and completion) and sub-phases of the monitoring and evaluation process (ex-ante, monitoring, on-going, and ex-post evaluation) are shown in Figure 3-1. The figure shows that ex-ante evaluation is concentrated in programme formulation and planning; monitoring and on-going evaluation both lie in the phase of programme implementation. Monitoring is concerned with the inputs/activities-outputs stage, while on-going evaluation is concerned with the outputs-effects/immediate impacts stage. Ex-post evaluation is done on effects/immediate impacts stage of implementation phase and the long term impacts after project completion.

The nature of NAFP requires that any evaluation be on-going, since the final impact of the project may not be assessable for 60 years. Thus, monitoring and evaluation are closely tied together in the case of NAFP.

Figure 3-1: MONITORING AND EVALUATION IN RELATION TO THE PROGRAMME PROCESS



Source: United Nations, 1978.

3.4 Conditions for Successful Monitoring and Evaluation

Monitoring and evaluation should be a tool for decision makers. That is, they should be designed to gather information that facilitates and supports rational decision-making. Decisions about the programme or project occur at different political and administrative levels, and decision-makers who participate in the various programmes need different types of information. Political leaders, who always play an important role in the decision-making process, often believe in 'seeing things with their own eyes' (UN 1978, p.41) rather than relying on abstract data. So those who undertake monitoring and evaluation should be able to convince decision-makers of the importance of their information in drawing conclusions about the programme. Information generated through the system should supplement the information gathered from other sources and personal inspection. So an important condition for the success of monitoring and evaluation is that all information should be relevant to the purpose, quickly available, and accurate.

As one of the purposes of NAFP, indeed the most important goal of NAFP, is the generation and dissemination of information about social forestry, the presentation of information in a concise and convincing manner will be of particular importance. This information will need to be presented with different emphasis and varying content depending on the target of dissemination - foresters and managers from other projects, government officials, and local residents.

Monitoring and evaluation should be as economical as possible without delays in supplying relevant, timely and accurate data. This is possible if monitoring and evaluation concentrates on obtaining the most necessary information, applying straightforward methods of analysis and uses the data gathered for monitoring and evaluation for supplementary purposes.

In order to produce relevant, timely, and accurate data, monitoring and evaluation should be continuous processes of problem definition, measurement, analysis, and comparison and judgement of programmes (UN 1978, p.72). Problem definition refers to the specification of the topics in the programme as well as the information to be gathered. Measurement refers to the collection of data about the programme. Analysis includes review, categorisation and tabulation of

data. Comparison and judgement is the comparison of the findings with stated objectives.

On the basis of judgements, there will be a selection between alternative actions, and the implementation of action will necessitate another round of monitoring and evaluation. Monitoring and evaluation are shown as a study cycle in Figure 3-2.

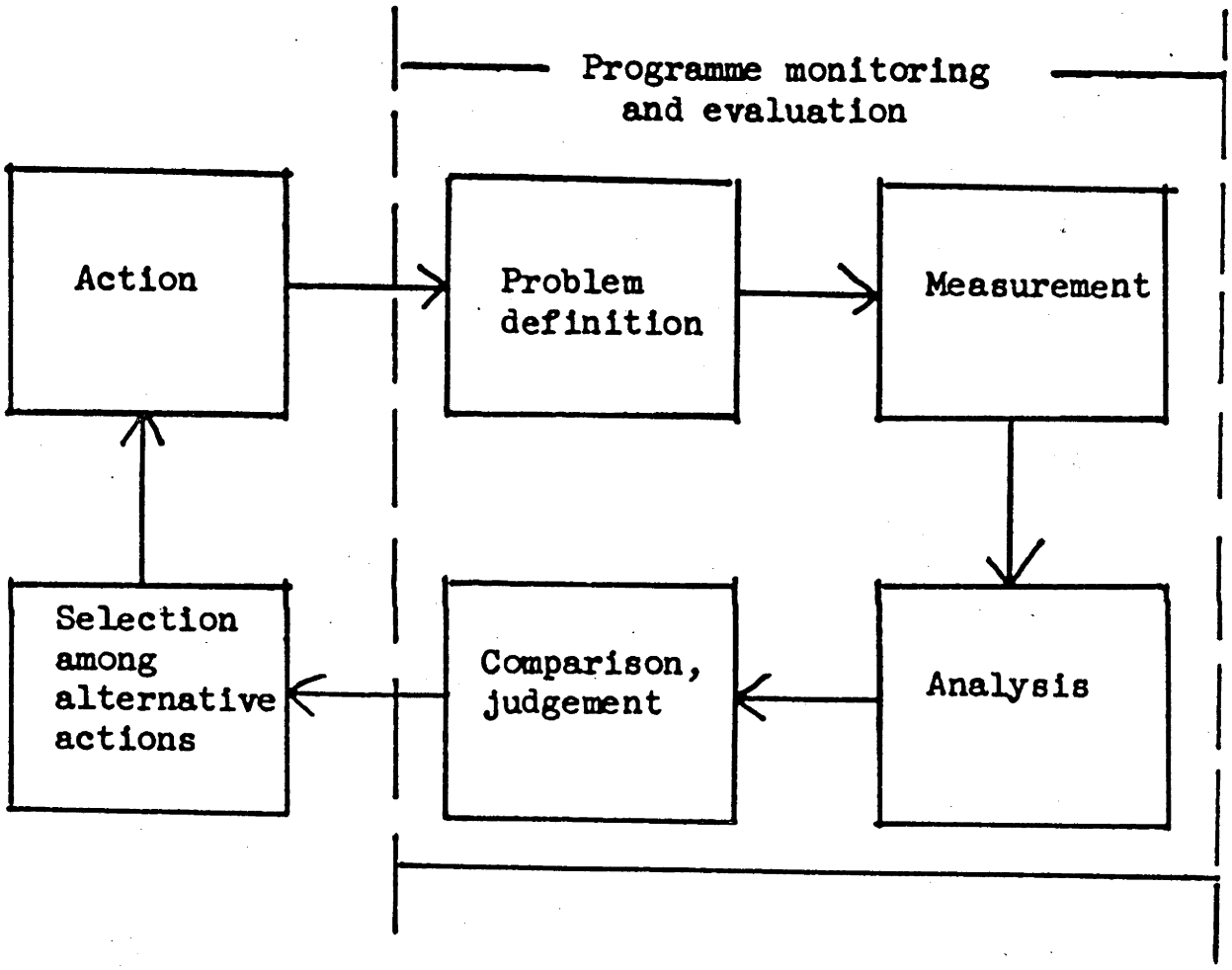
To make the programme successful and effective, monitoring and evaluation should be an integral part of the programme process. That is, when new projects and programmes are introduced, emphasis should be given to the establishment of a permanent and economical monitoring and evaluation unit. This unit assists in the operations of the monitoring system by:

- identifying project targets and measurement indicators
- collecting and analysing data from the project's target group
- establishing communication linkages between beneficiaries and management of the project
- collecting, summarizing and disseminating information for distribution to the units of the project and between the project and the programme
- identifying and analysing problems during implementation and suggesting possible solutions for them
- preparing reports that highlight the achievements of the project.

Moreover, permanancy of the monitoring and evaluation unit will help to train staff to carry out the work more efficiently, helping to standardize monitoring and evaluation concepts for the programme.

While there will be no separate monitoring and evaluation unit in NAFP (i.e. no definite individuals whose task will be that of monitoring), this does not lessen the importance of a monitoring system in the design of the project. It will be necessary for the key project staff to develop a 'monitoring consciousness', so that part of their regular duties will be the gathering and recording of information on the various project activities. This work by project staff will constitute the monitoring unit.

Figure 3-2: THE MONITORING AND EVALUATION STUDY CYCLE



Source:United Nations, 1978.

3.5 Choosing Indicators

Indicators (which are measures of change) can usually be obtained easily for inputs, activities and outputs, but there are difficulties in developing indicators for effects and impacts. Indicators should be selected for their socio-economic significance. Socio-economic significance here covers employment and the living conditions of the people, including distributional considerations (Schwefel 1975, p.22). Furthermore, indicators must be justified in cost-benefit terms.

General indicators are health, nutrition, housing and related amenities, education, employment, income, consumption, leisure and its use, cultural activity, and religious activity. Since objectives and strategies vary from programme to programme, it is very hard to generalise indicators suitable for all programmes. The main impact of NAFP is on consumption, employment and, eventually, nutrition.

3.5.1 Monitoring indicators

The first group of monitoring indicators includes:

1. financial disbursement figures
2. progress of physical construction relative to a predetermined critical path
3. staff and equipment usage rates.

(Casley et al. 1984, p.36)

This information can be obtained from the official records maintained in the project office. In this case there are few problems in obtaining data, the main problems are of collation, analysis and presentation of data. It might be necessary to rely on estimates for some components of the second factor above. The second set of indicators for monitoring are:

1. technical parameters depending upon the nature of the programme such as genetic adaptability of tree species, development of phenotype characteristics
2. environmental parameters, eg control of soil erosion
3. economic parameters, eg changes in agricultural and livestock systems.

The first of these are usually well-defined indicators and can be

calculated from secondary sources of information. They are crucial to the project. However, the environmental and economic parameters are not well-defined in the case of NAFP, as these are impacts which will be evident only after a long time.

The immediate and crucial objective of any project is to provide sufficient inputs to obtain the stated outputs. Thus there is a need to monitor the input supply, and for this indicators include credit supply, direct farm supplies, extension advice, educational, health or social facilities, construction of buildings, and the expenditure of resources. This type of monitoring indicates whether the targeted population received the benefits or not. This can be determined with the help of indicators such as input usage rates, adoption rates, and repayment rates, to collect this data it will be necessary to undertake household surveys.

3.5.2 Evaluation indicators

In evaluation the following three types of indicators can be identified:

Output indicators: The outputs of projects are expressed in terms of production, and the measuring of production will vary from project to project. In the case of forest products, yield per tree and yield per unit area will be the best estimators of production. Although not high in input costs, forestry projects are unusally extensive in both time and space (Cracknell, 1984 p.53). It is difficult to estimate biomass production, but we can use survival rates, growth rates, and quality of the trees. Measurement of production will depend on the number of trees and output per tree. The measurement of forest products uses head-loads, but there are problems in using this measure. The physical conception of a head-load of firewood or fodder varies from place to place and from person to person.

Effect indicators: The generation of outputs will certainly affect the targeted population. The effects are expressed in the form of economic benefits which affect the standard of living of the people. The standard of living is defined as the level of satisfaction of the population's needs attained in a unit of a time as a result of the flow of goods and services which the population enjoys in that unit of time (Drewnowski 1970, p.38).

Typically, economic benefits are measured in money terms, so income may be the obvious choice of indicator. The estimation of income is relevant only when the output is totally sold: in the case of a product which is consumed in the household, monetary income alone is an inadequate measure. The benefits of a forestry project such as NAFP are almost entirely unmarketed.

Data on income from marketed output may be collected from traders or agencies; their records provide a check on farmer's responses in production.

Similarly, independent estimates of cash receipts can be done by collecting prices of crops or other agricultural produce, these can be collected regularly at markets, together with estimates of production.

However, if total farm or household income needs to be measured, the difficulties become extreme. In that case, we need to calculate and apply shadow prices, because the output of the forests is neither traded nor marketed. In this case, though indicators are well defined and measurable, surveys are expensive and present many statistical problems.

Impact indicators: The impact is measured by the improvement in the quality of life of the community. It tries to measure the level of welfare, defined as the welfare status of the population (Drewnowski 1970, p.76). The selection of indicators to measure quality of life is a very complex task. The concept of quality of life has been defined in various ways and is vague. But in general, the indicators affecting quality of life include food consumption, health, education, shelter, access to essential amenities, and life expectancy, child nutritional status, distance or time to fetch potable water or firewood in rural areas. Thus while the quantification of the quality of life may be vague, we can feel or visualise the changes occurring in that area with the help of the project. Some indicators are measurable directly, others have a subjective element, and it is very hard to distinguish between effects and impacts, because they often overlap. But the difference lies in differences of time, scale, and scope. In other words, effects will show up at an early stage, apply to direct beneficiaries, and relate to specific aspects of rural activity, whereas impact may occur later. The impact is the final result, taking into account direct and indirect effects.

The impact of NAFP is expected to be mainly in the areas of time to collect wood, consumption of forest products, cleaner water supplies (in some villages), environmental stability, and increase agricultural and livestock production.

3.5.3 Sources of indicators

Primary and secondary sources may be used to create indicators. Monitoring and evaluation of a programme starts first by reviewing the existing data and deciding whether these data are adequate in the light of programme objectives. After the availability of existing data has been evaluated the identification of sources of data to be collected in the future is undertaken.

Both formal and informal contacts with key local and central officials involved in the collection of statistics are worthwhile. Data are generally of numerous types and many may be unpublished. For particular programmes or projects, collecting and assessing secondary data may be more difficult than conducting surveys. Secondary data may be collected from government departments and research institutions.

Past surveys, although designed with different objectives, may provide a general picture of the prevailing situation. These broader data can be used as a 'backdrop' for comparative purposes (Casley 1982, p.50). In monitoring and evaluation, careful attention should be paid to adopting standard concepts and definitions, in order that data from the project are comparable with other non-project data sets. This type of similarity will be mutually beneficial for both parties, broaden the data base and focus on the project management's own needs.

However for the particular programme or project the main sources of data for monitoring and evaluation should be administrative records, rapid observation, case studies, sample surveys and census results.

The existing administrative records provide the required information about the project, project area and the beneficiaries of the project. The use of administrative records often requires determination and time for turning voluminous files into succint and decision-oriented information.

Substantial and visible information about the project can be collected quickly and cheaply by simply providing a good overview of an aspect of the project such as housing or construction. It involves

recording the observed facts as well as discussion with local officials or selected local people.

Case studies generally refer to a long, detailed study of the community, farm management, peoples lives and their behaviour. This type of case study may be exploratory or research-oriented. For the purpose of monitoring and evaluation, this study has to be carried out by a single professional investigator with experienced research assistants.

Sample surveys are designed for either descriptive or analytical purposes, but in most cases are meant for both. This type of survey can range from a quick survey covering one topic in one area to a detailed survey taking as many samples as possible to examine various topics. This type of survey often does not reflect true intentions and attitudes because, in less developed countries, farmers or other beneficiaries do not have the habit of keeping records and may have to depend on recall of past events (see also problems of household surveys).

For the purposes of monitoring and evaluation, census data for the specific area where the project is launched can be used. Before using it, it needs to be assessed very carefully, as the census covers the whole country and may not give much information on a specific area.

In the case of NAFP, all the possible sources of data are applicable and relevant to its purposes. As a research project, NAFP has maintained very good administrative records which indicate the existing situation of the project.

Rapid observation followed by case studies (of one or two plantation sites) can highlight the successes and failures of the project. The sample survey (household survey) presents the overall view of the local people towards NAFP's impact in the project area. It also explains people's attitude towards the project.

The macro level data of the project area (land use data, total forest area, total population, rainfall and climatic condition) has to be obtained from census results.

3.6 Problems of Household Surveys

A rural household survey will be essential to collect information for evaluating the project. It will allow analysis of the prevailing patterns of forest resource use (fuelwood and fodder) in relation to local farming systems, provide baseline data for future evaluation of the project, and identify measurable effects of the project after some years of operation.

The surveys should include randomly selected samples from a command area (affected by NAFP) and a control area (not affected by NAFP). These techniques are used to ensure the representativeness of the samples selected.

Except for project activities, there should be a close similarity between the command and control areas. The control area should be close to the command area, so that major climatic differences do not exist, and there should not be other forestry projects in the control area. The survey should be conducted using a pre-determined questionnaire which has been pre-tested to check that it can be understood by the local people, and that it generates the required information. The finialised questionnaire must be straightforward and easily understandable by survey teams and local people.

The household survey needs to be conducted by an experienced research firm, so that critical and unbiased evaluation of the results is possible. In evaluation, the timing of research is very important in two senses: firstly, determination of the length of research intervals; and secondly, the setting of dates for data collection. The length of research intervals is the time between two measurements and depends upon the time required for the project to produce outputs, effects, and impacts. The dates for data collection depend upon seasonality, the nature of production and the planning or budgetary cycle.

The main problem in getting accurate information from rural households is that farmers in the project area, as in other parts of the country, do not keep farm records. All primary data rely on farmers' recollections. Farmers may be unreliable sources of information because of inaccuracy of recall, lack of exact information on project outcomes, or be unwilling to divulge information on such

matters as land ownership for fear of taxes. Furthermore, the data collected from the farmers may not be representative of all panchayats in the project area, because of the great variety of socio-economic and physical conditions in the project area (see below).

Some data, such as improvements in the standard of living, developments in tertiary activities and the impact of indirect effects, can not be reliably obtained from farmers on a recall basis. Moreover changes measured in these areas cannot be said to have occurred only as a result of the project. Problems encountered in the household survey can be at least partially overcome by the following methods.

Firstly, the information collected during the field survey has to be checked throughly in the field, and if any discrepancies arise the particular households have to be revisited.

Secondly, household survey data will have to be supplemented wherever feasible by a physical mesurement study of a few households from the total sample. That is, to determine the accuracy of the reported information on yields, for example, a crop cutting survey and measurement of land area. In the case of NAFP, physical verification has to be done by weighing loads of firewood and fodder.

Thirdly, interviews with key informants of the panchayat (if the panchayat is large, wards or villages within the panchayat) are required to verify the information provided by individual households. These interviews should be group surveys of eight or nine villagers (depending on the situation), and need to cover all micro and macro information. This type of survey is helpful for cross checking information gathered from households, and for collecting information which can not be obtained from households.

Fourthly, these problems can be partially solved if the project induces selected households in the project area to keep written records of their economic activities. The data from these households have to be collected regularly. The total period covered by the survey should be at least one year in order to cover all seasonal activities, and the inducements to keep records should be in the form of material benefits.

Lastly, data collection should be preceded by efforts to convince the farmers of the importance of the survey to the continued success of the project.

Collection of primary data will be very time-consuming and expensive, and it will sometimes be difficult to isolate changes due to the project. But most of the problems can be solved and the results obtained from a properly-formulated and well-conducted household survey, which will be reliable and representative if the above-mentioned procedures are followed.

So far we have discussed the reliability of the survey- that it measures what we want it to measure. The replicability of the survey refers to the problem of reproducing the results. This is of particular concern in the project area because of the great diversity of environmental, economic and social conditions in the Hills. The replicability of the survey data depends only on sample selection- its size and randomness. Randomness can be ensured by appropriate sampling techniques. The size of the sample depends on the resources made available for data collection. The degree of replicability of survey information is therefore decided by the project management.

3.7 The Logical Framework in Monitoring and Evaluation

The logical framework approach (LFA) was developed by USAID in 1978 to monitor and evaluate projects undertaken by the agency in developing countries, and now has been widely adopted by other bilateral and multilateral donors. The LFA has proved an important tool enabling the presentation of a project in a systematic, orderly fashion while simultaneously considering the complementary views of management, scientific method and systems analysis. USAID first defined LFA in 1969 as

> A set of interlocking concepts which must be used together in a dynamic fashion to develop a well-designed, objectively described and evaluable project (p.4).

In other words, LFA defines projects in a concise, complete, and objective manner. The approach identifies the objectives of the project very clearly, and clarifies organisational responsibility. In addition the LFA relates physical inputs to interrelated societal inputs and highlights goals. Thus from the preparation of a logical framework a project can be understood clearly, communication and formulation can be achieved easily, its progress can be followed and its results examined.

Thus LFA is a very useful management tool, as well as being useful for building a comprehensive monitoring and evaluation system. Before any opinion can be formed on how a programme should be monitored and evaluated, it is essential to know what the programme is intended to do and how it operates. LFA defines the goal, purpose, output, and inputs of the programme in quantifiable terms. Moreover, it defines a heirarchy of objectives, assumptions, and targets. USAID has defined it in the following way:

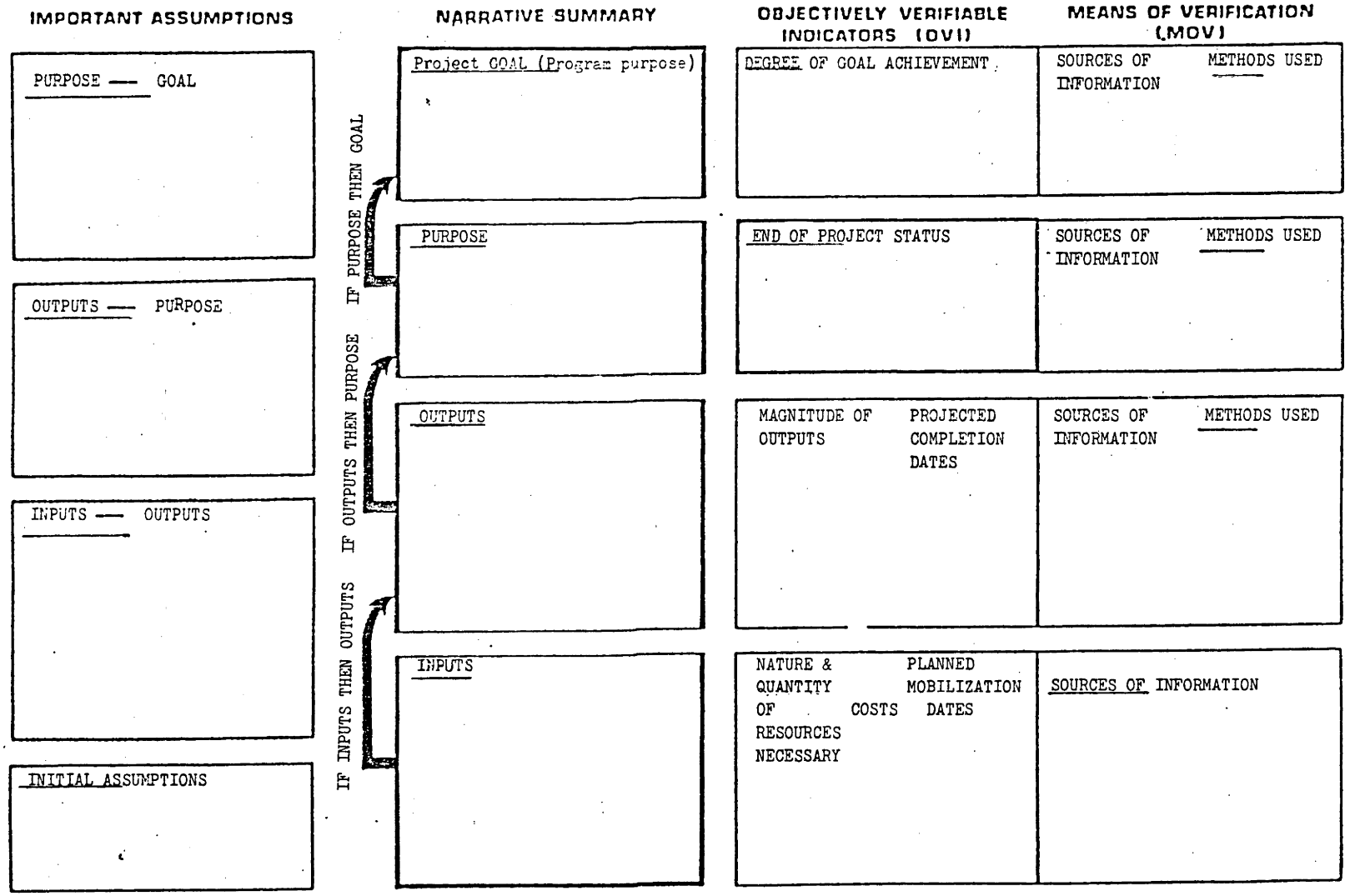
> LFA is a way of expressing the linkage between the various levels of project objectives and the means to be mobilized to achieve them. At the same time it states the important assumptions about factors external to the project which must hold true for the linkages to occur, from the means on up to achievement of the goal. In addition the method involves a definition of the conditions which will signify that the necessary means have been mobilized, and the various levels of objectives achieved and concurrently, the ways in which this can be verified (p.5).

LFA has been summarised in a four by four matrix which is called the 'logframe', and this is presented in Figure 3-3. The rows represents the levels of project objectives and the means required to achieve them, while the columns represent how achievement of these objectives can be verified.

LFA is of continuing interest because it provides communication about the project and all information needed to understand the project clearly and concisely on a single summary table. This is advantageous if many people are involved in project design and management. In sum, LFA is a way of thinking logically and tries to establish linkages between means and ends. So it constructs a closely related hierarchy of causes and effects. Inputs are the cause which generate outputs, outputs help to achieve the purpose, and achievement of the goal. The approach alerts managers to a set of external factors over which they have no direct control, but which are crucial for continued progress of the project. It provides a foundation for eventual evaluation, from the time of conceptualization to the achievement of goals.

From the disussion, it is obvious that the LFA is not only a crucial instrument for monitoring and evaluation but also an important programme planning device. This emphasises once more that the design of the monitoring and evaluation system should be an integral part of the

Figure 3-3: LOG FRAME



Source: USAID, 1978.

programme planning process. The logframe can be divided into vertical and a horizontal logic.

Vertical Logic:

This presents the logic of the project referred to as the narrative summary and the list of external factors which could influence the achievement of objectives, designated as the important assumptions. USAID explains:

> The vertical logic attempts to describe the logical presentation of differing levels of objectives (narrative summary) of a project as well as external factors (important assumptions) which could influence their achievement (p.10).

So vertical logic, which is shown in Figure 3-4, can be explained according to the hierarchy of project objectives, and the causal linkages within the hierarchy. The hierarchy of project objectives involves a series of levels which are related to one another by causal or logical linkages. The linkages between inputs, outputs, purpose and goals represents the internal hierarchy of the vertical logic of the project.

The causal linkages of cause and effect within the hierarchy are expressed clearly in terms of "If...Then", as long as important assumptions prove accurate. If inputs are properly supplied, then outputs are produced as expected. If outputs are produced as expected, then the purpose will be achieved. If the purpose is achieved, then the goal will be achieved. Thus vertical logic is based upon the principles of causality from inputs up to goals.

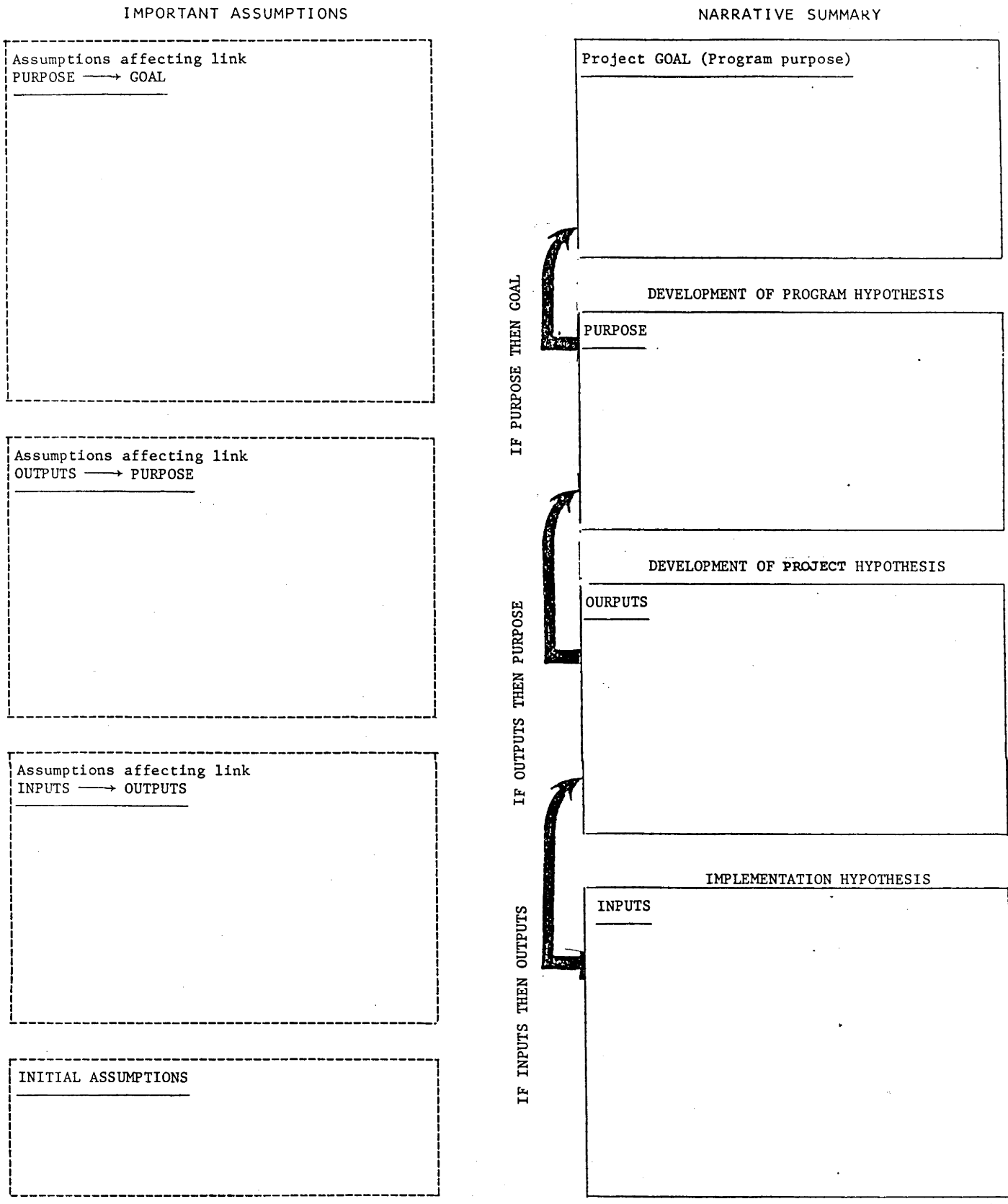
The LFA makes assumptions about the important elements of the vertical logic. LFA identifies four sets of assumptions: the initial assumptions at the start of the project; assumptions about factors affecting the inputs-outputs linkage; assumptions about factors affecting the outputs-purpose linkage; assumptions about factors affecting the purpose-goal linkage.

The existence of these assumptions shows the prevalence of uncertainity in all human activity and of externalities which affect the performance of the project or programme, and are beyond the control of the project.

Horizontal Logic:

The elements which focus upon project management are represented

Figure 3-4: VERTICAL LOGIC



Source: USAID, 1978.

in the horizontal logic. Horizontal logic includes the definition of specific ways by which various levels of objectives can be established. USAID described horizontal logic as:

> The objective of the horizontal logic is the measurement of the resources and results of a project, through the identification of objectively verifiable indicators and means of verification for these indicators (p.22).

The horizontal logic aims at identifying precisely the results to be achieved at each of the four levels of vertical logic which are shown in Figure 3-5. The horizontal logic by identifying the objectively verifiable indicators (OVI) and the means of verification (MOV) of these indicators, helps to interpret the project results of different projects in the same way.

The OVI correspond to the set of criteria which signal that expected results have in fact been produced. In the matrix, it is presented next to the narrative summary, because this gives precise meaning to statements in the narrative summary. The OVI should indicate criteria for the success of the project, must focus on important objectives, must be plausible, must be sufficient in number, must be independent of each other, and must be objectively verifiable. But in some cases OVI have to rely on indirect indicators which must be precisely defined.

MOV ensure that the previously defined OVI can be measured effectively. They have complementary roles. They confirm that indicators chosen are realistic and facilitate project evaluation. The MOV must therefore be associated with each objectively verifiable indicator, that is, with respect to types of data, source of information and data collection techniques.

In totality, LFA presents a procedure of evaluating the performance of social programmes. Firstly, fundamental goals and objectives are presented, then measures of the degree to which each goal is being realized at any given point are provided, and, lastly, these measures are formulated and applied to particular programmes (Alberts 1970, p.97).

Figure 3-5: HORIZONTAL LOGIC

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS (OVI)		MEANS OF VERIFICATION (MOV)	
Project Goal (Program Purpose)	DEGREE OF GOAL ACHIEVEMENT		SOURCES OF INFORMATION	METHODS USED
	Objectively Verifiable Indicators that the project GOAL has been achieved.		Preferred sources of information for measuring OVIs of PROJECT GOAL achievement reports, official statistics, collaborators, etc.)	Specific methods chosen for collection of information needed to measure the OVIs of PROJECT GOAL achievement (analysis of files, investigations, observation, etc.)
PURPOSE	END OF PROJECT STATUS		SOURCES OF INFORMATION	METHODS USED
	Objectively verifiable Indicators that the PURPOSE has been achieved (the OVIs of End of Project Status have a special Importance since it is by them that one can measure the DEGREE OF SUCCESS of the project).		Preferred sources of information for measuring OVIs for PURPOSE.	Specific methods chosen for collection of information needed to measure the OVIs for PURPOSE.
OUTPUTS	MAGNITUDE OF OUTPUTS	PROJECTED COMPLETION DATES	SOURCES OF INFORMATION	METHODS USED
	Quantity and quality of OUTPUTS to be produced during the project period.	Target completion dates for each of the OUTPUTS.	Preferred sources of information for measuring OVIs for OUTPUTS.	Specific methods chosen for collection of information needed to measure the OVIs for OUTPUTS
INPUTS	NATURE AND QUANTITY OF RESOURCES NECESSARY	COSTS	PLANNED MOBILIZATION DATES	SOURCES OF INFORMATION
	List, by category, of human and material resources required for project implementation.	Anticipated budget as a function of resources required.	Mobilization schedule for each category of activities, by phase of Implementation etc., according to the organization of project.	INFORMATION OF THE ACTIVITIES, RESOURCES, COSTS, SCHEDULES AND OTHER PERTINENT ASPECTS OF COOPERATION PROJECTS IS GENERALLY FOUND IN THE FOLLOWING DOCUMENTS: ° Project Identification Paper ° Project Document ° °

CHAPTER 4

DESCRIPTION OF THE PROJECT AREA

4.1 Project Area

The NAFP is under the auspices of the Central Regional Forest Directorate. The project area encompasses two districts, Sindhu and Kabhre, which lie to the east and north-east of Kathmandu (see Figure 4-1). The Directorate is one of five regional forest directors. For administrative and geographical purposes Nepal is divided into five development regions and fourteen zones and each zone is subdivided into districts, and each district into town or village panchayats[1]. Each village panchayat comprises nine wards. The office of NAFP is in Chautara panchayat, head-quarters of Sindhu District in Bagmati Zone.

4.2 Physical Characteristics[2]

NAFP covers a total area of 386,846 hectares (ha.): Kabhre with 126,810 ha. and Sindhu with 260,036 ha.(Griffin 1985, p.5). This is approximately 2.74 per cent of the total geographical area of Nepal. The altitude of Kabhre ranges from 1007 to 3018 metres, while that of Sindhu ranges from 760 to 7084 metres. The project area can be divided into four geographical regions according to altitude:

The Himalayan Region (above 4880 metres) is above the snow line. The region includes the Jugal Himalayan range comprising six of the highest peaks ranging from 6000 metres to 7084 metres. As the Himalayan region is always covered by snow, there is no agricultural activity and as a result no permanent habitation. The only vegetation found in the

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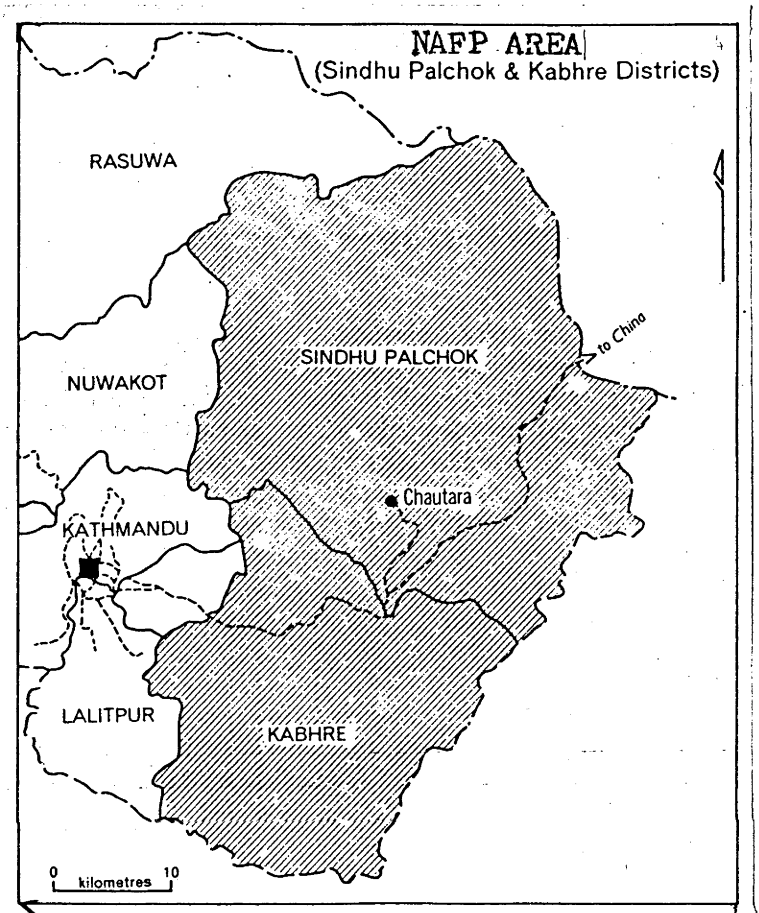
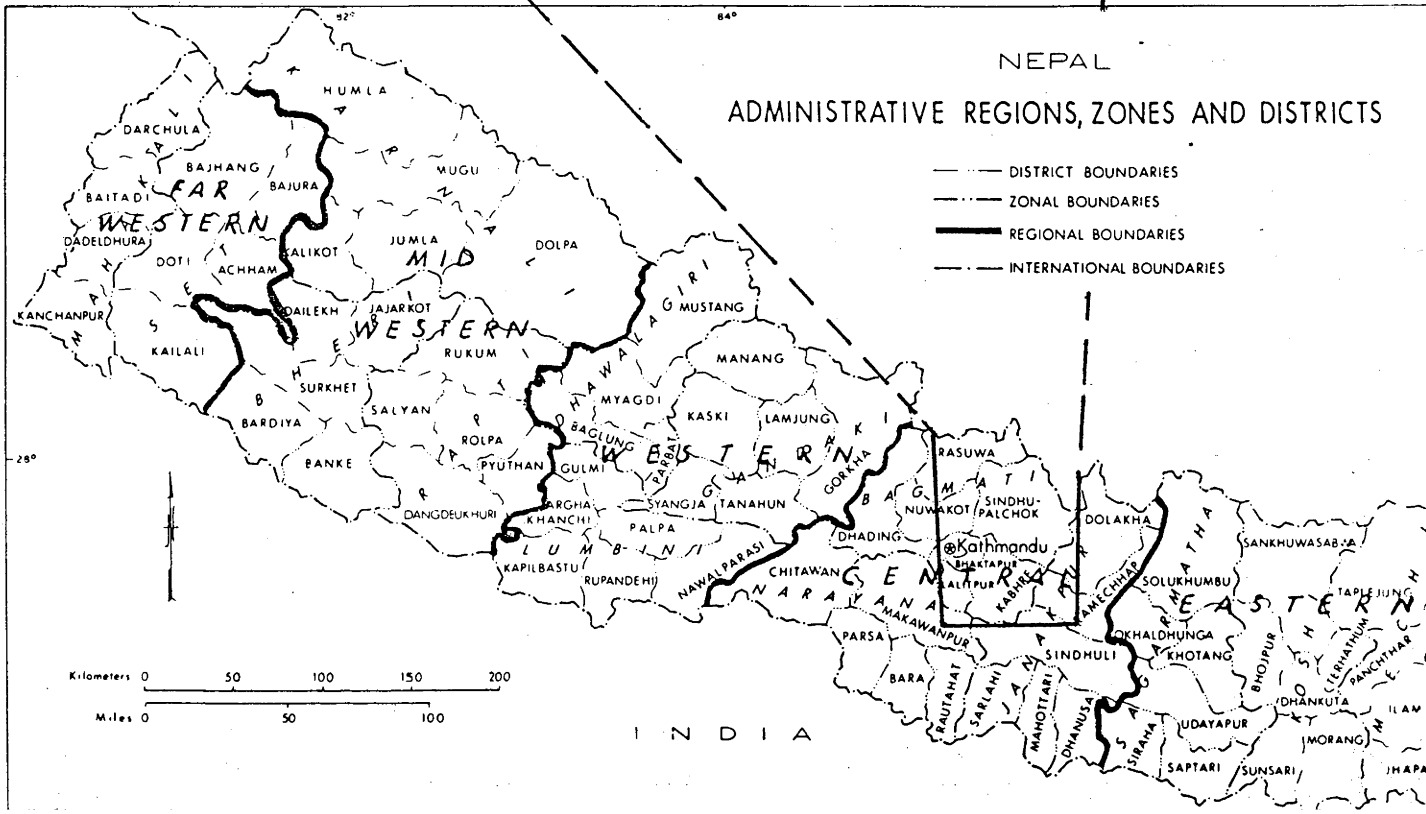
[1] A panchayat is a subdivision of local Government in Nepal. It refers to a local village community also.

[2] Unless the source is quoted the discussion is based on HMG 1974, Mechi to Mahakali, Central Development Region, volume 2.

Figure 4-1: LOCATION OF NAFP AREA





area is moss, and there is no possibility of other vegetation growing due to the extremely harsh climate.

Lekali Region (2133 to 4880 metres) is generally located on ridges or on the higher slopes of mountains. This region can be further divided into two climatic parts: Firstly, the area between 4000 and 4880 metres where the climate is extremely cold and the region is covered by snow for six months of the year. During the summer months, people from lower parts move their livestock to the higher parts, although the region is not suitable for cultivation. Secondly, the area between 2133 to 4000 metres which has a cold winter and a warm summer. In this cold temperate climate, there are coniferous forests like Tsuga dumosa, Walnut (Juglans regia), Fir (Abies spectabilis), and Juniper (Juniperus recurva) trees. Cultivation of crops is very difficult and only potatoes are grown in this region. Thus the area is very thinly populated and pressure on these forests is less than at lower elevations.

The Hilly Region (1515 to 2133 metres) is a heavily populated region with a warm temperate climate, neither very hot in summer nor very cold in winter, and the area is suitable for cultivation. This area is suitable for different species of trees such as chilaune (Schima wallichii), chestnut (Castanopsis indica), rhododendron and oak. Though most of the area has already been deforested, some patches of forest still remain in the higher regions.

The Lower Plains (760 to 1515 metres) are very hot in summer and mild in winter. The area is very suitable for production of crops such as paddy, mustard and various other grains. This area grows various species of trees: Sal (Shorea robusta), Chir pine (Pinus roxburghii), Chilaune (Schima wallichii), Chestnut (Castanopsis indica), rhododendron and oak.

4.3 Demographic Characteristics

The total population of Kabhre was estimated to be 299,344 people in 1980, with an estimated growth rate of 2.25 per cent per annum (Aryal et al. 1982, p. 316). In Sindhu the total population was estimated to be 232,326 in 1981, with an annual growth rate of 1.3 per cent during the period 1971-81 (Ranjitkar 1984, p.9). The growth rate

in both districts was below the national growth rate of 2.6 per cent (World Bank 1984, p.254).

In 1980, at the national level, 93 per cent of the labour force was engaged in agriculture, 2 per cent in industry and 5 per cent in services (World Bank 1984, p. 258). These two districts do not deviate much from the national pattern. Being hilly regions, and in the absence of other obvious employment opportunities, the majority of the population in both Kabhre and Sindhu districts depend on agriculture for their livelihood.

The District-level breakdown of occupations for the 1981 census is not available. The 1971 census showed that 96.9 per cent of people depended on agriculture in Kabhre and 96.5 per cent did so in Sindhu (Aryal et al 1982, p.316 and 326). This was higher than the national average.

4.4 Agricultural System

The total area under cultivation is 34,334 ha., of which 16,500 ha. are in Kabhre and 17,834 ha. in Sindhu (Griffin 1985, p.5). Generally land is divided into Khet and Bari. Khet refers to wet or irrigated land which is generally situated in the vicnity of a river; Bari is dry and unirrigated land, which is sloping and located in the hills, where, due to its topography, irrigation is impossible and cultivation of crops depends on the rainfall.

Farm holdings are very small and are fragmented into two or three plots or more, often located in different places. The average per capita area of land holdings[3] in Kabhre is 0.06 ha., and in Sindhu 0.08 ha., these are much smaller than the national average of 0.15 ha[4]. Farms are generally too small to produce marketable surpluses, so in the project area farms are mostly of a subsistence nature. Agricultural techniques and practices are traditional, external inputs are minimal and mechanisation is non-existent. Crop farming depends on the

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[3]The average per capita area of land holdings is calculated by dividing total cultivated area by total population.

[4]The HMG's Department of Food and Agricultural Marketing Services (1977) has estimated the total cultivated area to be 2,326,000 ha. in Nepal.

compost/dung of livestock used as fertiliser. Since purchasing power is limited, modern techniques in agriculture can not be introduced. Thus, aside from a pair of draught animals and a simple wooden plough for land preparation, all operations are done manually, and most labour is performed by family members, although some wealthier farmers hire day-labourers.

Agricultural activity is dominated by arable crops, particularly food grains, and these crops account for the major part of agricultural production in the project area. Crop production is dominated by paddy and wheat in Khet, and in Bari by maize and millet. But in the project area as a whole the predominant crops are maize and paddy.

In the project area two basic cropping patterns can be observed. Firstly, paddy-based cropping patterns for irrigated land i.e. Khet; secondly, maize-based cropping pattern for rainfed land i.e. Bari (Mahat 1985, p.53). The cropping pattern on rainfed Bari is a mixed cropping of maize and soybeans followed by mustard or millet. In the rainfed and irrigated Khet, paddy is followed by wheat and sometimes by barley or potatoes. Due to the terrain of the project area maize and millet are becoming important crops, as in the hills these grains give a larger yield than paddy (ADB/HMG 1982, p.64). Though most cropping patterns are based on paddy and maize as a result of altitude, soil and micro-climatic conditions, variations can be noticed over short distances. The cropping patterns in the project area are dictated by factors such as slope of the land, intensity of rains and hail, and duration of sunlight. So, depending upon the situation, farmers practice mainly mixed or relay cropping.

The total cropped area in Kabhre is 25,503 ha. while in Sindhu it is 19,567 ha. (Griffin 1985, p.5). This gives a cropping intensity[5] of 155 in Kabhre and 110 in Sindhu. The cropping intensity of Kabhre comes very close to the cropping intensity of irrigated Terai land, which ranges from 132 to 175 (APROSC 1982, p.26). But the cropping intensity of Sindhu is lower than the rainfed Terai land, which ranges from 124 to 154 (APROSC 1982, p.27). In Sindhu, cropping intensity is low due to

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[5]Cropping intensity is the total cropped area as a percentage of the total cultivated area.

the fact that only 6.9 per cent of total land is under cultivation. In Kabhre, while 13 per cent of total land is under cultivation, the cropping intensity is high because of the widespread practice of double cropping.

4.5 Livestock System

Livestock are an inseparable part of agricultural production in the project area. Livestock-rearing and crop-farming are integrated, and the former subsist on the by-products and wastes of the latter. Moreover, under the closely integrated traditional farming system, large numbers of cattle are considered essential for sustained crop farming, as a supply of draught power for ploughing and manure for composting for maintaining soil fertility. Manures are not traded in the project area, so every family has to produce manure to meet their requirements.

Livestock also provide essential food items such as milk, ghee, and meat for human consumption. In the case of Korea, Park (1979, p.12) confirmed that, although different species of livestock are kept for different purposes, the main reasons were to obtain manure and draught power. This is similar to the livestock system in the project area. In the project area as a whole, cattle, buffaloes, sheep, goats, pigs, and poultry are the most common species of livestock. Cattle are kept for milk, for ploughing the land, and for religious purposes. Buffaloes are kept for their milk and meat, while sheep, goats, pigs, and poultry are kept only for meat. Sometimes goats are also kept for milk, but only in small numbers.

The total number of livestock and number per capita[6] in the NAFP area are shown in Table 4-1.

In the country as a whole, the World Bank (1979) has estimated 6,800 thousand cattle, 3,900 thousand buffaloes, 4,600 thousand sheep and goats, and 300 thousand pigs (quoted by Shrestha 1982, p.4). This gives 0.44, 0.25, 0.30, and 0.02 per capita of cattle, buffaloes, sheep and goats, and pigs respectively. The numbers per capita of cattle and

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[6] Livestock per capita is obtained dividing total numbers of livestock by total population.

Table 4-1: Total and Per Capita Livestock Numbers in NAFP Area

Species	Sindhu (1977)	Kabhre (1979)	Total Numbers (000)	Number Per Capita
Cattle	94.89	93.50	188.39	0.35
Buffaloes	44.99	47.88	92.87	0.17
Sheep	16.97	2.10	19.07	0.04
Goats	82.92	136.54	219.46	0.41
Pigs	4.58	4.08	8.66	0.02
Poultry	178.39	178.26	356.65	0.67

Source: Aryal et al. (1982, p.316,326) for livestock numbers.

buffalo in the project area are below the national average. The per capita numbers of sheep and goats are also below the national average, while that of pigs is about the same. In totality, the per capita animal population in the project area is 0.67, far below the national average of 1.01.

In the Lekali region of the project area, the principal occupation is livestock farming. In the summer months, people move from lower to higher elevations with all their livestock and live there for nearly six months. Yak and chouri (a cross of yak and cattle) are the main livestock raised in this region. In the hilly and lower plains region rearing of livestock is the second most important occupation after crop production.

Livestock rearing in the project area to some extent supplements the family income. Farmers in the project area occasionally sell milk, sheep, goats, chickens and pigs. If the farmers are in desperate need of cash, they often sell large animals, mostly buffalo. Farmers also sell bullocks if they have more than they need for ploughing. Rearing of livestock in the project area is becoming more difficult due to the shortage of fodder, and the existing livestock are suffering from malnutrition and even starvation. Yet in the present situation, Shrestha and Evans (1984, p.155) confirmed from a household survey undertaken in the project area, that returns from animals appear to significantly outweigh the costs involved in rearing livestock.

Institutional support from HMG for livestock development is minimal, except for distribution by NAFP of some fodder species of trees for private planting.

4.6 Nepal-Australia Forestry Project (NAFP)[7]

4.6.1 NAFP-1

The NAFP is one of several afforestation projects in Nepal. The first Australian involvement in Nepal came in 1962 when HMG approached Australia, under the auspices of the Colombo Plan, for assistance in establishing plantations of fast-growing eucalypts. Plantings of chir pine and experimental plantings of eucalypts were begun in 1966, and continued until 1971, mainly in Kathmandu and its surrounding areas. These plantings were done in a rather ad hoc manner.

Australian aid has become more effective since 1972 when the Department of Forestry, ANU, took on the responsibility for administration and technical guidance of the project. The activity of the project was concentrated on nursery establishment and species trials, however staff also helped to reforest 13,000 hectares of land throughout the country. During the project period 1967-77, 68 per cent of the plantations were in the Hills and the remainder in the Terai. The main species used in the Hill regions were chir pine (Pinus roxburghii) with some blue pine (P. wallichiana)and a small number of broad-leaved species. In the Terai the main species planted were sissoo (Dalbergia sissoo), and Khair (Acacia catechu) with some teak (Tectona grandis).

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[7]The following sections are based on discussions with and publications by staff of the Project and the Department of Forestry, ANU. See especially 'Operations of the Nepal-Australia Forestry Project in the Chautara Forestry Division' and, 'Information Guide to the Nepal-Australia Forestry Project'.

4.6.2 NAFP-2

NAFP-2 started with broader objectives in October 1978. The nature of NAFP-2 was innovative for HMG, for local people, as well as for the implementing agency. It was certainly innovative in a country which does not have a history of planting and conserving forests. The philosophy behind NAFP-2 was community forestry, which is about and for rural people. So it was concerned with small-scale community forestry operations at the panchayat level with active community involvement. Community forestry has also been described as social forestry, farm forestry and agro-forestry. The community forestry approach is seen as a potential tool for local social and economic development through local initiatives. Because of this stress upon the local control of resources (forests), the benefits arising from it can be distributed in the light of local perceptions and priorities. Furthermore, it emphasizes the strengthening of local institutions for carrying out the processes of economic development and resource management. These activities also generate new local employment opportunities, and most importantly, it helps to conserve soil.

Thus NAFP-2 was designed to promote community forestry by rationalising and improving local practices of using forests, rather than by imposing a new philosophy on communities, and activity was concentrated on reforestation in the Sindhu and Kabhre Districts. NAFP-2 also helped the Forest Department to establish a tree seed unit in Kathmandu as a centre for seed collection, storage and distribution throughout the country. The project also assisted with forestry education in Nepal. NAFP-2 assisted in the implementation of the National Forestry Plan in Sindhu and Kabhre by helping with the demarcation of forest land, the establishment and operation of nurseries, reforestation of HMG forest, PF, and PPF.

Structure and management

NAFP-2, from a management and financial viewpoint, is different from other foreign aid projects. On the management side, the project is the joint responsibility of both Australian and HMG staff. A first memorandum of understanding (MOU) was drawn up by the Australian Government and HMG which detailed the areas of responsibility and a framework within which they should operate. The project coordinating

committee, which has the power to change the MOU, consists of representatives from both Australia and Nepal. The project manager, who represents the Australian Government and the then Divisional Forest Officer (DFO) who represents HMG, work as co-managers. Thus joint decisions are made on nursery and plantation establishment, and on local staffing arrangements.

In the area of financial management, the managing agent (Department of Forestry, ANU) handles the budget, and funds are channeled directly to NAFP. This is the most successful part of the project, as it avoids the unnecessary delays inherent in almost all aid projects operating in Nepal, where budgetary requirements are channeled through the HMG, Ministry of Finance.

Once the financial constraints were defined the Co-managers prepared a plan of management, and produced budgets to draw on the funds and resources of HMG and NAFP-2, allowing fieldwork to start quickly and efficiently.

Field operations

The success of NAFP-2 relies heavily on the goodwill, interest and cooperation of the local people, and the success of the project is dependent upon the people's participation. Although people have gained economic support from the forests in the past they have not realised the importance of protecting the forests. While farmers took resources from the forests they did not put resources back in, so as to make the forests renewable. NAFP-2 intends to bridge this gap by convincing the panchayats of the importance of their role in the protection, growth, and replanting of forests, and in the sharing of the benefis within the community.

The begnning of local participation requires the panchayat to make a written application, to the DFC in Chautara requesting the establishment of a nursery. In the application the panchayat has to undertake to provide volunteer labour for nursery construction and to prevent livestock entering the plantation sites. This sort of commitment from the panchayat shows the interest that local people have in the project and their willingness to work for the success of the project. In most panchayats, NAFP-2 paid subsidies to assist in the employment of nursery naikes (foremen), assistant naikes, forest watchers and casual workers.

Probably the most crucial factor in maintaining the interest and cooperation of local people, and hence ensuring the success of the project, is to convey to the people that the benefits from the forest will, in the long term, be for the community as a whole. Similarly, the species of trees to be planted need to be well-known and popular among the local people. Fifty per cent of the seedlings planted each year by NAFP are pines, either Pinus roxburghii or Pinus patula. New Era (1980) concluded, however, that rural people's order of preference for planting on their private land is: fruit trees, then fodder trees, fuelwood species and timber species, in that order.

NAFP-2 has emphasised pine, which is considered to be second rate firewood, due to the poor quality of land in the project area and the fast growth rates of pines. Land having no agricultural potential is the only land available for afforestation. Such land is inherently unproductive, or its productivity potential has been lost due to erosion or heavy exploitation. On this type of land, the chances of survival of many species is very marginal. In such a marginal situation, Pinus roxburghii has become very successful where most other species fail to survive. Moreover, Pinus roxburghii has been growing around that area for a long time, and it has developed a genetical surviving capacity in that area. Furthermore, the Pinus roxburghii phenotype has developed an environmental stress resistance capacity. Hence, the selection of species has been dictated by natural constraints.

Trials have shown that Pinus roxburghii flourishes in lower areas while Pinus patula is better suited to higher elevations. Pinus patula is popular among the naikes and local villagers as it can be grown at both lower and higher altitudes. It grows rapidly and survives better than other species. In several areas of Pinus roxburghii plantation, many hardwood species are growing, because the former has improved the fertility of the soil and created suitable surroundings for hardwood species. This will not only supply the preferred firewood varieties but control environmental degradation in the vicnity of the plantation sites. The locally adapted species will have both qualitative and quantitative benefits for the surrounding areas.

Recognising that the success of the project depends on the

commitment of the local people, NAFP-2 has provided fruit tree seedlings at subsidised rates, and involved itself in the plantation of fodder trees in the panchayats which supply voluntary labour. NAFP-2 has also promoted a simple and feasible technology of using tubed stock and the collection of local seeds to meet panchayat needs. Similarly, where possible the use of local materials to construct seed beds, standout beds and nursery buildings has been emphasised.

More recently some changes in field operations have been made. In 1981 NAFP-2 introduced a payment system for pitting and planting, following the practice of the World Bank funded CFDTP, and it has started a panchayat-level training programme for local people.

Afforestation activities

The introduction of the Forest Act in 1977 by HMG made it possible for local communities to acquire land from the Government for purposes of planting and protecting trees. However, NAFP-2 has established nurseries and begun afforestation activities only at the request of the local communities, and requests for afforestation from panchayats have always exceeded project targets. By October 1982, a total of 35 community nurseries had been established and many more were under consideration. The planting covered a much wider range of species than were previously planted, including fruit, nut and fodder trees that are accepted by the local people. A most important development in afforestation practice, was the successful establishment of plantations without using fencing. In a country where people's immediate needs are more urgent than future needs, the development of such a forest ethic is vital. The forest ethic has mainly been developed due to the persistent efforts of the NAFP and local people in the project area. In most cases local people were very helpful and kept their animals away from new plantations.

Table 4-2 shows establishment of nurseries by NAFP-2 for each year. Note that HMG had established 4 additional nurseries in the project area up to 1982/83. In several panchayats (Thokarpa, Tukucha, Kabhre and Isalukarka) school nurseries were established in addition to the panchayat nursery. School nurseries aimed to disseminate the forestry message as quickly as possible throughout the community and, in remote rural areas, schools are an appropriate means of speedily

Table 4-2: Establishment of Nurseries by NAFP-2

Fiscal Years	Numbers
1978/79	1
1979/80	11
1980/81	5
1981/82	8
1982/83	10
1983/84	16
1984/85	16
Total	67

Source: NAFP, 1984.

communicating ideas. The project provided a naike and the community was required to carry out work such as carrying soil, filling tubes, and pricking out seedlings. In the case of the school nurseries a fixed number of seedlings is paid for by the project, and schools were paid at standard rates for pitting and planting.

The area under plantation showed an increasing trend on HMG land. In the case of PF land a small decline in 1980/81 and 1981/82 was followed by a substantial rise in 1982/83. The total area under plantations was 2175 ha. of HMG land, 1633 ha. of PF, and 55 ha. of PPF up to 1983/84. The details are shown in Table 4-3. Seedling production for plantation purposes and for private distribution have also increased. For plantation purposes in the period 1978/79 to 1982/83 there was an increase, but for private distribution there was a decline in 1981/82, followed by a projected increase in 1982/83. In Table 4-4 the achievements in seedling production have been summarised. NAFP-2, after planting of PF and PPF, hands them over to the respective panchayat. According to the Forest Act, PF and PPF must be planted and protected within five years from the date on which land is provided by HMG. Table 4-5 shows the numbers and areas of PF and PPF returned to panchayats. During the four years of the project, a total of 45 PF were handed back, with an area of 1838 ha., and a total of 28 PPF were handed back, with an area of 921 ha. An integral part of afforestation

Table 4-3: Area of Plantation Established (ha.)

Planting Seasons	Fiscal Years	HMG	PF	PPF
1979	1978/79	100	-	-
1980	1979/80	100	280	-
1981	1980/81	219	233	-
1982	1981/82	479	220	-
1983	1982/83	637	353	23
1984	1983/84	640	547	22
Total	-	2175	1633	55

Source: NAFP, 1984

Table 4-4: Seedling Production for Plantation Purposes And Private Distribution

Planting Seasons	Fiscal Years	Plantation Purposes (Nos)	Private Distribution (Nos)
1979	1978/79	765,240	-
1980	1979/80	817,480	8,020
1981	1980/81	1,177,310	32,690
1982	1981/82	1,286,400	27,600
1983	1982/83	1,732,500	50,000
1984	1983/84	2,131,080	90,000
Total	-	7,910,000	208,310

Source: NAFP, 1984.

activities was the demarcation of forests. In some areas concrete pillars were used, while in others local raw materials were used. The length of forest boundries surveyed and marked each year is shown in Table 4-6. The total of HMG forest boundaries demarcated was 429 km., and for combined PF and PPF it was 8 km. to fiscal year 1981/82. In

Table 4-5: Number and Area of PF and PPF Handed to Panchayats

Fiscal Years	PF		PPF	
	No.	Area(ha.)	No.	Area(ha.)
1978/79	10	247	9	195
1979/80	11	261	9	307
1980/81	6	828	4	345
1981/82	4	164	0	-
1982/83	NA	NA	NA	NA
1983/84	14	338	6	74
Total	45	1838	28	921

Source: NAFP, 1984.

fiscal years 1982/83 and 1983/84, the forest boundries demarcated was 146 km. and 74 km. respectively. The breakdown between PF, PPF, and HMG is not yet available.

Table 4-6: Demarcation of HMG Forest and PF or PPF (km. of Boundary Surveyed)

Fiscal Years	HMG Forest	PF or PPF
1978/79	50	0
1979/80	120	0
1980/81	75	0
1981/82	184	8
Total	429	8

Source: NAFP, 1984.

The total of HMG forest boundaries demarcated was 579 km., and for combined PF and PPF it was 58 km.

To further boost the participation of local people in project activities, distribution of fruit trees such as citrus, apples, peas, plums, peaches and mangoes was undertaken. At first these were freely

distributed but later sold at subsidised rates. In one year approximately 5000 trees were distributed in the project area.

Training

Another important activity of NAFP-2 has been the organisation and financing of various training programmes. Trained professional and sub-professional staff were in short supply, and without the proper trained personnel the project could not advance, thus training has become an integral part of the project. NAFP-2 has organised training for Nursery Foreman, Forest workers, and Forest Guards. It has also funded forestry institutes at Hetauda and Pokhara and provided scholarships for study in Australia.

The main focus of training has been to produce middle and lower level trained personnel and, by fiscal year 1982/83, 97 nursery foreman, 27 forest workers and 125 forest guards had been trained by NAFP-2. NAFP-2 has also organised training for personnel from other forest divisions and from other projects, and demand has greatly exceeded its capacity to provide training.

Construction Programme

Within Chautara Division, NAFP-2 has constructed buildings for the storage of nursery materials and accommodation for nursery workers and visitors, beat quarters, a training centre, an office for the Division, and fully financed the construction of a 10.6 km road from Lamidanda to Sipaghat in the Indrawati valley. It also constructed the Tree Seed Unit in Kathmandu for seed storage, testing and distribution.

Land Use Mapping

One of the objectives of the project is to draw up management plans for HMG forest land, PF and PPF in the project area. To achieve this it was necessary to develop land use maps showing various land use categories, this was achieved through the use of aerial photographs and constant ground checking by field visits. This task was completed by 1982.

4.6.3 NAFP-2 Extension

NAFP-2 was extended from November 1984 to December 1985, this extension is intended to provide for:

1. Continuing the operations of NAFP-2 at an appropriate level
2. A through feasibility study, planning and documentation of NAFP-2
3. Smooth operational transition between NAFP-2 and NAFP-3
4. Setting the stage for, and in some cases setting in motion, certain of the changes to be developed in NAFP-3.

Thus NAFP-2 extension, by continuing with NAFP-2 objectives, will prepare the ground for the implementation of NAFP-3.

4.6.4 NAFP-3

NAFP-3, with the broader objectives, of improving local economic condition by intensifying production of forest products and preserving the planted trees (or forest resources), is due to start in January 1986 and will run for five years. It will be incorporated in HMG's Seventh Five Year Plan (1985-1990). The objectives of NAFP-3 as outlined in the Project Document are as follows.

1. The overall objective (goal) is to improve the standard of living of the local people in the project area and the development of self-sustaining systems for production and distribution of both tangible and intangible benefits of the forest.
2. The specific project objectives (purpose) are to develop and prove an operationally viable methodology for implementing socially acceptable and technically appropriate forest management systems for community forests and a method for developing communities capable of sustaining forestry activity in the project area.
3. The output objectives of the project are, sound and community-based forest management plans, quantitative appropriateness of PF and PPF to community forestry, greater responsibility for forest management and protection at the local community level.

The main objective of the project is the successful implementation of the community forestry concept. Community forestry is seen as a forestry development activity, the benefits of which accrue directly to rural communities. It includes the production of a range of forest products, growing trees as fodder crops, and processing of forest

NAFP-3 comprises components for infrastructure, education and training, community work and extension, reforestation, silviculture and management, and demonstration. Forestry is the most important component, and will stress afforestation of PF and HMG land, establishment of nurseries and their operation, and plantation establishment and maintenance. Protection of PPF and management of forests will also be an important component of forestry.

Technical problems to do with the suitability of tree species and their growth trends was, to some extent, solved during NAFP-2. But the major and crucial task for NAFP-3 will be the management of forests, stressing the fate of new forests created by the project.

NAFP-2 and its extension will have established some 4050 hectares of new forests by the 1985 planting season. Until recent times, these forests have not been subjected to harvesting, although the oldest trees, which were planted in 1974, may have grown to the stage where they start giving a yields to the local people. Thus, the crucial phase of sharing the benefits has arrived and this will require very good management systems for PF and PPF. The importance of management plans has arisen due to:

1. The need for early rewards for the community, so that their involvement in future activities of the project, and fulfilling the future needs of the people, will continue.
2. The increasing area of land under plantation.
3. The need for silvicultural intervention in increasing plantation, before the growth of trees limits harvesting options.

So NAFP-3 will be concerned with relevant applied research, methodological innovations for silvicultural and utilisation investigation, management planning and operations. The heart of the concept of community forestry is the involvement of forest users in the management of the forest. So community forestry is viewed as complementary and inseperable from the practical implementation of NAFP-3.

In forest management, the concept of sustained yield has been implicitly included (Meyer et al., 1961 p.9). The primary objective of good forest management is the provision of the maximum benefit for the greatest number of people over all time (Brasnett 1953, p.3). The

society of American Forestors (1958) defined sustained yield as the management of forest property for continuous production with the aim of achieving, at the earliest practicable time, an approximate balance between net growth and harvest, either at annual or somewhat longer periods (quoted by Meyer et al., 1961, p. 9).

Any form of management for obtaining sustained yields from forests requires maintenance of an adequate growing stock capable of producing adequate yields for fulfilling peoples' demands. That is, instead of focussing on the unsystematic depletion or liquidation of a forest, it concentrates on the productive use of a forest, followed by afforestation with suitable species. It helps to manage and protect a forest at the same time as fulfilling the needs of the people. NAFP-3 will emphasize the sustained yield concept by laying down clear cut policies for pruning and thinning, and by defining user groups.

For planning purposes, community forestry can be discussed seperately from the technical aspects of forestry. But in the operational phase both have to operate side by side. The operational integration between the community and technical aspects emphasises the need for the extension of technical forestry knowledge and skills to the local level. The transfer of technical skills to local communities, and the responsibility of local communities for forests are the basis of forestry management and utilisation of PF and PPF lands by local communities.

With community forestry, mechanisms for the management and distribution of forest products have to be based upon small scale local user groups. In the project area, in the absence of proper transportation facilities, every small group within a panchayat works as an independent unit for their own sustenance, so these groups will be the social catchment area for particular tracts of forest within each panchayat.

Thus, NAFP-3 has to make panchayats as responsible as possible for plan implementation and the sharing of the benefits. Local panchayats are quite competent to regulate grass cutting, lopping and distribution of forest products, such as fuelwood and timber, and outside intervention should be able to be restricted to drawing up guidelines for forest stocking i.e., number of trees to be planted per hectare at

various stages of development for different forest types, and general technical guidance.

CHAPTER 5

DESIGN OF MONITORING AND EVALUATION SYSTEM FOR NAFP-3

5.1 Objectives

This project has a long time horizon and some effects and impacts can only be measured after thirty or forty years of tree growth. This makes regular monitoring and evaluation critical.

To draw a distinct line between monitoring and evaluation is difficult, but in the case of NAFP-3 some clear-cut guidelines can be drawn. The monitoring of NAFP-3 involves the collection of data on a regular basis in order to keep the project on target, and evaluation is based on the information generated in the monitoring process. Evaluation in this case will probably be carried out after two years of the project and then at the end of the project, that is after five years. Evaluation at these times also serves longer term evaluation by examining the social and economic implications of the project, including the appropriateness of the community forestry concept.

5.2 Explanation of Logical Framework

The logical framework matrix for NAFP-3, as shown in Figure 5-1, has been drawn up to describe the project in summary form. It sets out project activities and helps to identify the kinds of information which would be useful for monitoring and evaluation. It starts by laying out the assumptions of the different stages of the project. It summarizes the project at each stage: inputs, outputs, purposes and goal. Furthermore, the matrix defines the objectively verifiable indicators (OVI) and the means of verification (MOV) for each stage.

The monitoring and evaluation system of this chapter elaborates the details of feasible methods of verification. However, monitoring and evaluation is also required to measure the indirect effects of the project on agriculture, livestock, work patterns and social

Figure 5-1: LOGICAL FRAMEWORK OF NAFP-3

ASSUMPTIONS	NARRATIVE	OBJECTIVELY VERIFIABLE INDICATORS (OVI)	MEANS OF VERIFICATION (MOV)
Purpose → Goal 1. Population increase will be moderated. 2. Continuing receptivity of HMG and communities to new management methodology and organization	**Goal** Adoption by HMG and communities of a forest management methodology and a sectoral organization that results in a balance between realistic demand and sustained productivity.	**Degree of Goal Achievement** The extent of this adoption and the degree to which a balance between yield and demand for forest products can be anticipated	1. Survey reports. 2. HMG Department of forests, organization and activities. 3. Verbal or documentary evidence of the beneficial influence of the Project outside the Project area.
	Purpose To develop, prove and demonstrate an operationally viable methodology for implementing socially, and politically acceptable and technically appropriate forest management systems.	**End of Project Status** 1. Documentation of methodology. 2. Management Plans in operation selected panchayats. 3. Demonstration of Socio-Economic value.	1. Reference to HMG and Project records and publications. 2. Field inspection. 3. Benefit-cost analysis report.
Outputs → Purpose 1. Criteria of Social and political acceptability remain stable. 2. Mechanisms are established for implementation of forestry legislation.	**Outputs** 1. A forestry sector occupying an appropriate place in land use. 2. An area and biomass of forest of appropriate composition and components. 3. An appropriate silvicultural operations program. 4. A technically and socially appropriate system for harvesting and distributing forest products. 5. Management plans for defined units of forest land. 6. Knowledge and understanding by local men and women and visitors of all aspects of community forestry. 7. HMG staff trained in community forestry. 8. A cadre of CF extension workers. 9. An appropriate physical, organizational and educational infrastructure to support.	**Nature and Quantity of Outputs** 1. Areas of forest planted/protected (HMG, PF, PPF. 2. Number of seedlings for private planting. 3. Number of nurseries (HMG, panchayat, private). 4. Number of buildings. 5. Length of demarcation (HMG, PF, PPF). 6. Number of trained staff. 7. Number of extension workers. 8. Number and nature of CF organizations. 9. Number of training programs held. 10. Components of yield properly related to utilization (fodder: Fuelwood; timber). 11. Yield, actual or potential, greater than at start of project on lands subject to MPs. 12. Enthusiasm for CF. 13. Number of Project visitors. 14. Number and quality of publications and films.	1. Planting/protection records. 2. Demarcation of records. 3. Declaration of PF, PPF records. 4. Growth studies and yield models. 5. Surveys of community inolvement in forestry activities. 6. Records of project activities. 7. Studies by independent graduate students. 8. Published reports and articles.
Inputs → Outputs 1. Social & political stability within the Project Districts. 2. Stability & continuity of HMG and Australian Staffing	**Inputs** 1. Finance for staff, materials, equipment and activities. 2. Knowledge and enthusiasm of staff. 3. Panchayat consultations. 4. Data generation, processing, storage and retrieval. 5. Activities: (a) Physical infrastructure, (b) Reforestation, (c) Extension work, (d) Field trials and surveys, (e) Demonstration of Project activity and rationale, (f) Training and education, (g) Publications.	**Nature and Quantity of Resources Necessary** 1. Australian and Nepalese staff (see lists). 2. Procurement (as in detailed budgets). 3. Training and education (see program). 4. Building and construction, including maintenance (see program). 5. Demonstration areas and their use. 6. Miscellaneous inputs.	1. Budget expenditure by code. 2. Records of purchases and distribution. 3. Records of training programs. 4. Records of students educated. 5. Records of buildings constructed and maintained. 6. Other records.
Initial Assumptions 1. HMG & Community support for activities. 2. Finance avialable and on time. 3. Australian and Nepalese staff availability. 4. Availability, if necessary by importation, of materials and equipment in Nepal.			

Source: Griffin, 1985.

organisations. The data collected during monitoring are necessary to conduct a sound cost-benefit analysis of the project.

The logical framework divides NAFP-3 into four stages: inputs, outputs, purposes and goal. Purposes and goal are the effects of the project. Purposes can be sub-divided into direct and indirect effects while the goal refers to the long term impact. At each stage, selection of indicators for monitoring and evaluation is based on the objectives of the project.

5.3 Project Inputs

The objectively verifiable indicators of inputs and their means of verification are summarised in Table 5-1. Indicators for monitoring at the input stage are: the budget allocated and spent, positions filled by category for both HMG and expatriate staff, building and land purchased by category, number of training programmes organised, number of demonstration plots, stove distribution, purchase and distribution of physical inputs, office equipment and supplies by category, local people's time and voluntary labour provided by them. The information required for these can be obtained from project records which show the budgeted amount and actual expenditure under different headings and allow periodic assessment of expenditure. Records maintain inventories on money as well as on material inputs.

5.4 Project Outputs and Direct Effects

There is a causal relationship between the inputs and outputs of the project. If inputs are supplied smoothly then outputs will be obtained. The generation of outputs depends on the project's activities, as described by the project document. The project activities to be undertaken during the project period are summarised in Table 5-2.

Table 5-1: Input Indicators

Objectively verifiable indicators	Means of verification
1. Budgeted expenditure	Project records
2. Technical assistance (expatriate staff)	Project records
3. Forestry staff (HMG)	Project records
4. Number and nature of training programmes organised	Project records
4. Buildings and land purchases	Project records
5. Demonstration plots	Project records
6. Stove distribution	Project records
7. Procurement and distribution of physical inputs	Project records
8. Office equipment and supplies	Project records
9. Local people's time spent on forestry related matters (panchayats meeting about forestry, direct involvement of Pradhan pancha and other members of village panchayats)	Project records
10. Voluntary labour invested by local people	Project records

Table 5-2: Activities of NAFP-3 During the Project Period

1. Infrastructure

   (a) Building construction

   Range quarters, beat and nursery houses, Kabhre district headquarters, Patlepani training centre

   (b) Building maintenance

   (c) Demarcation of forests

2. Education and Training

   (a) Training of forestry personnel at ANU and Hetauda

   (b) Forest guard and nursery naike training

   (c) Girls High School Scholarships

3. Community work and extension

   (a) Training of extension workers

   (b) Upgrading extension units

   (c) School curriculum development

   (d) School field demonstration

   (e) School education programme

   (f) Improved stoves installation

   (g) Pradhanpancha seminars (for panchayat leaders)

   (h) Banpali training (for forest guards)

   (i) Local training programme

   (j) Socio-economic survey

   (k) Panchayat consultations

4. Reforestation

   (b) Nursery activities (nursery and facility construction and operation, pitting, planting, tending)

   (c) Fruit tree distribution for private planting

   (d) Seedling distribution for private planting

5. Silviculture and Management

(a) Biomass studies leading to productivity estimates and growth modelling

(b) Investigation into various survey and inventory methods suitable for use in the hills

(c) Field trials programme (species, establishment, coppicing, lopping, palatability in case of fodder, harvesting systems)

(d) Protection of forests

(e) User survey (usage patterns in different areas among different ethnic groups)

(f) Construction of benefit distribution systems (surveys panchayat discussions, seminars)

(g) Formulation and implementation of management plans

(h) Formulation and implementation of improved management plans

6. Demonstration

(a) Audio-visual productions

(b) Demonstration to visitors

(c) Publication programme

Source: Griffin, 1985

On the basis of project activities, output and direct effect indicators, and their means of verification can be defined clearly. The outputs and direct effects are combined because the division becomes difficult to maintain in practice. The detailed output and direct effect indicators are shown in Table 5-3.

Table 5-3: Output and Direct Effect Indicators

Objectively verfiable indicators	Means of verification
1.(a) Number of buildings constructed and maintained	Project Records
(b) Hectares of forest demarcated	Project Records
2. Numbers of persons trained at ANU, Hetauda, and Girls High School	Project office/DFC
3.(a) Number of extension worker (including naikes) trained	Project office/DFC
(b) Number of extension units upgraded	Project office/DFC
(c) Number of school curricula developed	Project office/DFC
(d) Number of school field demonstration	Project office/DFC
(e) Number of school education programmes organised	Project office/DFC
(f) Number of improved stoves installed	Project office/DFC
(g) Number of pradhanpancha seminars conducted	Project office
(h) Number of Banpali trained	Project office/DFC
(i) Number of local people trained	Project office/DFC
(j) Socio-economic survey conducted	Project office/DFC
(k) Panchayat consultation	Project office/DFC
4.(a) Number of nurseries established	Project office/DFC
(b) Total hectares of land planted (by category and species planted)	Project office/DFC
(c) Number and species of seedlings produced	Senior naikes/naikes
(d) Number and species of seedlings distributed	Senior naikes/naikes
(e) Number of school nurseries established	Project office/DFC
5.(a) Predicted biomass produced from different types of forest	Project office/DFC
(b) Derivation of accurate stocking	

data by forest products	Project office/DFC
(c) Results of field trials indicating biomass of different species using different harvesting systems	Project office/DFC
(d) Areas of plantation protected (by category)	Senior naikes/naikes
(e) Adequate data on nature, quantity and periodicity of harvests required by local people	Project office/DFC
(f) Activities to facilitate creation of systems for equitable distribution of the benefits	Project office/DFC
(g) Number and nature of management plans implemented	Project office/DFC
(h) Effectiveness of management plans implemented	Project office/DFC
(i) Number of naikes and banpali employed for project activities	Project records
(j) Plantation survival rates of different species	Senior naikes/naikes
(k) Decrease in access to grazing land	Project staff
(l) Local adoption of improved stoves	Household survey
6.(a) Number of demonstrations organised	Project office/DFC
(b) Number of audio-visual productions and publications	Project office/DFC
7. Increase in forest area under the management of PF, and PPF	Project office and panchayat records

In sum the main output indicators for monitoring and evaluation are hectares planted, number of nurseries established, seedlings distributed, management plans drawn up for panchayat management, and number of persons trained in professional, semi-professional and skilled categories. Output indicators can be verified from project records, the project office, district forest controllers, senior naikes and naikes. The monitoring system should consist of interrelated progress reports from project staff, DFCs, rangers, assistant rangers, senior naikes and naikes. These reports can be prepared by compiling and aggregating information obtained from physical inventories, interviews and written records.

Clearly there will be difficulties in obtaining the required information, complete and on time, from all of the personnel involved in the project. This is partly because the panchayat level workers are usually illiterate and do not keep records. Additionally, DFCs, rangers and assistant rangers may be irregular and unreliable in reporting information. These problems arise principally from lack of proper training in record management. It will be essential for senior project staff to demonstrate to DFCs, rangers, and naikes the requirements for proper data recording. This will only be successful if these workers are convinced of the importance of this information for the project's success. Even so, the geography of the region and the pressures of work will leave an imperfect system of reporting.

The direct effects of the outputs will be observable, and to some extent quantifiable. The direct effects may be grouped into increase in employment opportunities, survival of seedlings, incremental amount of forest products, decrease in grazing land and local adoption of improved stoves.

When assessing direct effects, the plantation survival rates are important for predicting the amount of forest products that will be available in the future, and these have to be analysed according to altitude, site vegetation, aspect and species. Being a project of long gestation period, short run indicators have to be found to predict the actual benefits to be available in the future. To determine survival rates, plantation survival and private planting surveys have to be carried out in panchayats and private land. Survival is of much less signifance in community forestry than it is in commercial forestry. In the latter the species planted is the species yielding the final exonomic product, and survival rates are a valid criterion. In community forestry, particularly as practised in Sindhu and Kabhre districts this is by no means clearly so since deaths of planted species may allow more valuable volunteer species to flourish.

The surveys should trace the causes of mortality which may be grouped into the following categories: technical (seedling size, species selection, health at planting time, lack of weeding, time of planting, method of planting, and site preparation); social (livestock grazing, and fire); and others such as weather, insect damage and

wild-life. To measure plantation survival rates in the case of HMG forest, PF, and PPF, surveys of the sites should be sufficient.

Surveys need to be conducted yearly in late spring to determine survival rates after the dry season. For private plantings, a survey of the households which plant the trees supplied by NAFP is necessary, as private planting and survivals rates also depend on the household's economic status, landholdings, and knowledge of trees planted. This survey should be conducted in early spring or late autumn, and will help to explain the situation after free distribution of seedlings to individual households. The survey should be carried out by project staff with the help of senior naikes and naikes.

On the basis of plantation survival rates, the project staff can estimate the incremental amount of forest products available in the future, including fuelwood, timber, leaf fodder and grass fodder. In the project area, to fulfill immediate needs and encourage cooperation from local people, NAFP-3 has to encourage people to cut grass on the plantation sites. The project staff will be responsible for fixing the norms for average yield from plantations, and surveys are needed to make these estimates.

A visible direct effect is the generation of employment opportunities in the project area, including full-time employment for naikes and forest guards, and casual employment for silvicultural operations (pitting, planting, weeding, and portering). Data on this can be obtained from the project records. To assess increases in knowledge and effectiveness from training and seminars, occasional interviews with the trained personnel will be required and should be carried out by project staff responsible for conducting training. Project staff can also assess the decrease in grazing land due to the expansion of forest areas. Also a household survey has to be carried out to determine the local adoption of improved stoves in the project area.

5.5 Indirect Effects

The projection of indirect effects and long-term impacts depends on: employment generation relative to population growth; changes in prices of forest products; availability of substitutes for forest

products; and the rate of increase in social forestry production and efficiency. In the case of both indirect effects and long-term impacts, two problems arise in measuring changes. Firstly, the nature of the changes, such as increased income and agricultural productivity, are difficult to measure. Secondly, it is often not obvious whether changes are due to the project or other factors.

The indirect effects, which are the changes in local people's economic conditions, consumption patterns and labour-time allocation, are induced by the project rather than directly caused by the project, and it is particularly difficult to predict the indirect effects by looking at short run indicators. However, the indicators of the indirect effects and their means of verification are presented in Table 5-4.

Table 5-4: Indirect Effect Indicators

Objectively verifiable indicators	Means of verification
1. Change in allocation of farm household members' time	Household survey
2. Change in forest product harvesting pattern	Project staff/DFC
3. Increase in panchayat income	Panchayat records/DFC
4. Efficient energy comsumption	Household survey
5. Decrease in hazardous fires in forest areas	Senior naikes and naikes

These are summarised in the area of forest managed by panchayats, changes in allocation of farm household members' time, changes in forest product harvesting patterns, increases in panchayat income, more efficient energy consumption, and a decrease in forest fires.

One of the main objectives of NAFP-3 is to bring more forest under PF and PPF management. The indicators for this are: the area of forest managed by panchayats, and the areas of PF and PPF handed over to panchayats by HMG. This data can be obtained from the project office, panchayat records, and Ministry of Forest records.

Due to continual depletion of forests, local people are spending more time collecting firewood, fodder and timber, at the expense of other productive activities (see chapter 2). Thus the project's ability

to reduce the time spent on collecting firewood, fodder and timber is an indicator of a change in the allocation of labour time. That is, changes in per capita time spent collecting forest products and the use of time in other productive activities will be an important norm. To assess these changes a houshold survey in the project area will have to be carried out by an independent survey team.

Implementation of panchayat management of forests, which will include systems of pruning and thinning, will provide evidence of changes in the pattern of forest product harvesting. The number and nature of management plans implemented will be the relevant indicators, the means of verification for this will be project staff, DFCs and rangers.

Under the PF and PPF rules, panchayats can sell forest products to users, and thus when panchayats start to prune trees some revenue will be earned. The indicators for this will be increases in panchayat revenue per year, and this can be determined from panchayat records or DFCs, as panchayats are required to keep sales records themselves and to send progress reports to DFCs.

With the local adoption of improved stoves there should be increased efficiency in energy consumption and a decrease in per capita fuelwood consumption. The indicators will be the number of stoves distributed and adopted and the frequency of their use. Changes in energy consumption can be determined by undertaking a household survey, and this survey should be carried out by an independent research firm.

In well-managed forests there should be less possibility of fires occurring, the indicator for this, if worth measuring, would be hectares of forest burned per year. The source of verification would be senior naikes and naikes.

5.6 Long-Term Impact

When all the direct and indirect effects are merged together long term impacts will be generated. The forests in the hills of Nepal are an essential component in an integrated economic system of agriculture, livestock and forests (see chapter 2). On this basis, the long-term impact of the project will be on the agricultural and livestock systems of the area. A summary of long-term impacts and the means of

These indicators are much too broad to be feasibly assessed. Also, we can not isolate the impact of the project from other influences, and thus we can only evaluate a few concrete indicators of these broader changes. Besides incremental effects on forest products, one benefit from the project should be increased food production. Increases in forest products, mainly fuelwood from PF, PPF and private planting (PP), should reduce the rate at which cowdung and agricultural wastes are used as fuel, and as a result these can be used as fertilizers. The quantification of the extent of this effect is difficult, but use of cowdung and agricultural wastes as fertilizers will certainly help to increase production of food crops. This can be monitored fairly easily.

Table 5-5: Long-Term Impact Indicators

Objectively verifiable indicators	Means of verification
1. Reduction in use of dung and agricultural residues as fertilizers	Household survey
2. Increased livestock productivity	Household survey
3. Reduced soil erosion	

Livestock productivity should increase with the availability of a greater quantity and better quality of fodder, and this change in availability of fodder may lead to changes in grazing and feeding patterns. In the project area, private farms and traditional grazing areas are limited and can not provide sufficient fodder for livestock. As a result farmers depend on the forests. Thus an increase in forest area and availability of fodder may lead to increased stall feeding and decreased grazing days per animal per annum. This can be measured by the extent of stall feeding, number of livestock sustainable, types of livestock, and amounts and types of fodder consumed by livestock.

Leaf fodder is exceptionally rich in nutrients such as crude protein, nitrogen, calcium and phosphorus, as compared to grasses and crop residues. So the availability of sufficient fodder may change the species composition of livestock in the project area. Shrestha (1982) conducted a household survey in the project area, and concluded that:

firstly, an increase in the number of fodder trees may result in an increase in the number of buffaloes; secondly, a reduction in the time involved in collecting fodder may increase the number of goats. Thus, with the availability of sufficient fodder, farmers may move towards commercially viable livestock such as buffaloes and goats.

A major environmental impact of the project will be on soil conservation and the protection of water supplies. It will probably not be possible to obtain good estimates of the effects of the project on soil conservation.

5.7 Attitudes of Local People

People's attitude towards NAFP and forests is the crux of the project. This can be examined from three different angles: awareness, motivation and cooperation. Monitoring of changes in people's attitudes is necessary in order to demonstrate the long-term viability of community forestry.

Awarness can be defined by the extent to which people are aware of PF and PPF rules, and knowledge of the afforestation and nursery activities carried out by NAFP in the project area.

The indicators for monitoring of motivation are as follows:

1. Rate and number of applications for nursery establishment received by DFCs from panchayats
2. Commitment of the panchayats in providing voluntary labour
3. People's participation and their willingness to participate through informal meetings with local people about wider acceptance of forestry development
4. Consensus within panchayats for introducing project activities
5. Success in the implementation of PF and PPF
6. Tangible signs of the degree of commitment of the community to the establishment of nurseries, such as actually beginning work on nursery construction.

In the case of monitoring of cooperation, indicators can be taken as follows:

1. Absence of fencing around plantation areas. During NAFP-2 and its extension all nursery establishment and afforestation were done without wire fencing, so for NAFP-3

2. Initiatives taken by panchayats on questions of forest management, such as looking after nurseries, plantations, taking livestock out of plantations, and maintaining the forest ethic. In particular, the extent of voluntary protection of plantations will be a key indicator of local cooperation

3. Initiatives taken by panchayats on questions of pruning and thinning and distribution of forest products.

The attitude of people can vary within and between panchayats. Because panchayats are generally quite large and socially and culturally heterogenous, awareness, motivation and cooperation do not spread quickly and may vary according to the status of the people. Levels of awareness, motivation and cooperation may be higher among local elites, and low among other people. Variations will also occur between those panchayats having forestry activity and those without forestry activity.

Attitudes can change with increases in knowledge and the effectiveness of local people's actions as result of training, extension and seminars organised by NAFP-3. People's participation in community forestry activities and their changing attitudes towards NAFP and forests can be examined by undertaking surveys of the trained personnel. These surveys will need to be supplemented with information provided by DFCs and project staff.

5.8 Management

Monitoring and evaluation of management is very important, because effective management helps to convert awarness into motivation and cooperation. It may also help to reduce costs by making organisational arrangements more systematic and by achieving economies of scale in programme administration. It can be divided into three different stages: management of the project, management of the forest, and management of the distribution of forest products.

The management of the project is the process of converting inputs into outputs which generate direct and indirect effects and long-term impacts. The project staff are solely responsible for making this process successful and they will be responsible for monitoring their own performance.

Indicators for monitoring the management of the forest will be the

elements of success of the pruning and thinning systems adopted. This can be judged from the growth of the remaining trees in the plantation area. The means of verification will be harvesting trials and observation by project staff, leading to operational management systems.

Panchayats are responsible for the distribution of forest products according to PF/PPF rules, and panchayats are supposed to submit details of the prices fixed for forest products and the quantities sold to the DFC. While harvesting the forest products panchayats are required to follow rules laid down by the DFC. The monitoring indicators for the management of the distribution of forest products are as follows;

1. Number of panchayats following the harvesting rules laid down by the DFC
2. Sales reports submitted by panchayats to DFC
3. Prices for the forest products charged by panchayats

In addition to the reports submitted by panchayats to DFCs, project staff and DFCs should undertake informal household surveys in the concerned panchayats. This type of survey is aimed at revealing the distribution system of the forest products and the types of beneficiaries. They should take particular note of any complaints about the unfairness of distribution of forest products or restrictions on access to forests which cause dissatisfaction. Project staff and DFCs should make periodic reports on these questions so that the overall efficiency and equity of forest management systems can be continually monitored.

5.9 Household Survey

The household survey is one of the means of verification discussed above. Problems of household surveys, their reliability and replicability, are discussed in chapter 3.

It will be necessary to undertake two household surveys in the project area during the implementation phase of NAFP-3, one early and one at the end of the project. A follow-up survey might be conducted some years later to assess the long term impacts of the project. The

- patterns of forest resource use - consumption of firewood, fodder and timber

- livestock - numbers and species, methods of feeding, amounts, types and sources of feed.

- labour time allocation - collecting forest products, tending cattle

- energy consumption - burning of dung and agricultural residues, use of improved stoves

- agricultural aspects - application of dung, use of ploughs and other wooden implements

- private afforestation activities - numbers and species planted on private plots

- attitudes towards forests and community forestry.

CHAPTER 6

CONCLUSION

Forestry is one of the most important components of the closely integrated Hill economy of Nepal. In the present situation of continual depletion of forests in the Hills, NAFP is designed to increase the production of forest products (mainly fuelwood and fodder) through the extensive involvement of the community. It aims eventually to shift the responsibility of planting, protecting and maintaining forests and distributing forest products from government to rural communities.

The development of a monitoring and evaluation system in social forestry is new. The main purpose of a monitoring and evaluation system in NAFP is to generate and deliver information which will help to increase the effectiveness of management in achieving the objective of the project, and to provide information for other projects.

Though monitoring and evaluation are the two ends of a continuum of information, they are often separated conceptually and functionally. But in the case of NAFP, due to its long gestation period, monitoring and evaluation have been functionally integrated. Monitoring is considered as a time-bound aid to NAFP management and is linked with on-going evaluations. This integration is built on the existing information system of NAFP, which aims to improve project performance during implementation.

The monitoring and evaluation system of NAFP is developed from the logical framework concept used by USAID. The logical framework of NAFP determines objectives, describes operations, measures effects, and detects unanticipated consequences. The monitoring and evaluation indicators are grouped into inputs, outputs and direct effects, indirect effects, and long term impacts.

The monitoring and evaluation system of NAFP will deliver a wide range of information, from data on physical and financial progress to reports on the impacts in the project area and its vicinity. It will

also generate information derived from its performance to assist future similar types of programmes.

Data gathering and analysis will be conducted by using relatively simple techniques of investigation and analysis, rather than adopting sophisticated analytical methodologies which depend heavily on computers.

NAFP can collect data from two principal sources: the project office and household surveys. Precautions have to be taken while collecting data to ensure that it is reliable, measurable, timely, available, accurate and replicable. The project office can provide information on inputs, outputs and direct effects; to assess indirect effects and long-term impacts, household surveys have to be carried out, as indirect effects and long-term impacts are related to the size of communities and take place over a long period.

Data obtained from the project office is expected to be reliable and accurate, as the office keeps written and indexed data. In the household surveys, various sources of error are possible and these can be partially overcome by cross-checking data in the field, conducting group surveys alongside household surveys, and taking physical measurements of reported information wherever possible.

The household survey has to be conducted in both command and control areas in order to distinguish the effects of NAFP from those of other influences. The NAFP is not the only source of change. Furthermore, household surveys can be improved by convincing people of the importance of the project and inducing them to keep records of factors such as fuel consumption, stove use, and amounts of fodder and firewood collected.

Monitoring and evaluation emphasizes techniques of rapid observation, case studies, and periodic reviews in order to cover the area which is outside the routine sample survey area, and to some extent to help solve urgent problems faced by NAFP. Evaluation of people's attitudes towards NAFP and forests is necessary, as social changes depend upon receptivity among members of the community. The change in attitudes can be determined by people's awareness, motivation and cooperation. It will be necessary to monitor the distribution of forest products since the success of the project depends on broad community support.

In NAFP, it is not necessary for a permanent monitoring and evaluation unit to be established, but one or two personnel involved in the implementation of the project should carry out regular monitoring activities. Job descriptions for project staff need to include well-defined monitoring activities, and MFSC and ADAB should include monitoring activities in job specifications for DFCs and project management. Monitoring has to be undertaken in a thoroughly professional manner, but it will take time to develop an efficient and tested system. The basic prerequisite for monitoring of NAFP, is the development of an efficient record-keeping system from which required information can be easily abstracted and reports prepared.

Evaluation should be carried out by an experienced, private research organisation in order to examine the project's performance and its effects and impact without bias and with a fresh outlook. Prerequisites for sound evaluation are careful sampling design and preparation of survey questionnaires. The organisation which will be responsible for evaluation will select a standard sampling procedure; and questionnaires have to be prepared for both household and group surveys.

This evaluation should provide, as far as possible, quantified analysis and interpretation of indirect effects and long-term impacts i.e. production of forest products, labour-time utilisation, effects on agricultural and livestock systems, people's outlook, and community participation.

In carrying out monitoring and evaluation, management faces the problem of resource constraints. While resources should be allocated to the most essential requirements, a degree of flexibility should be maintained in order that unanticipated events and trends can be incorporated into the system.

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